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DATA COMPILATION REPORT: STRATA DEFORMATION MONITORING, NO. 3 TBM TUNNEL, DONKIN-MORIEN MINE, N.S.

T.R.C. Aston, D. Chipman and W.D. Gallant
Cape Breton Coal Research Laboratory

March 1988

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by

T.R.C. Aston*, D. Chipman** and W.D. Gallant***

SUMMARY

Between March 1986 and February 1987, a geotechnical monitoring program was undertaken in the TBM portion of the Donkin-Morien Mine No. 3 tunnel. Six extensometer sites were installed to monitor strata deformation in the tunnel crown at selected sites.

This report represents a data base compiled from all the geotechnical data collected in the TBM portion of the No. 3 tunnel and is intended as an addendum to the Golder Associates rock/support interaction contract report issued in January 1986. An analysis of the data base is not included in the report.

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RAPPORT DE COMPILATION DES DONNÉES : SURVEILLANCE DE LA DÉFORMATION DES STRATES, TUNNEL TBM N° 3, MINE DONKIN-MORIEN, NOUVELLE-ÉCOSSE

par

T.R.C. Aston*, D. Chipman** et W.D. Gallant***

RÉSUMÉ

Entre mars 1986 et février 1987, on a entrepris un programme de surveillance géotechnique dans la portion TBM du tunnel de la mine n° 3 Donkin-Morien. On a prévu six sites équipés d'extensomètres pour observer la déformation des strates au toit du tunnel en des sites sélectionnés.

Ce rapport représente une base de données compilant toutes les données géotechniques recueillies dans la portion TBM du tunnel n° 3, et sert de supplément au rapport de la Golder Associates sur l'interaction entre la roche et le soutènement, rapport fait sous contrat et publié en janvier 1986. Dans ce rapport, n'est pas incluse l'analyse de la base de données.

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INTRODUCTION

Between February 1983 and December 1985, a major geotechnical research program was undertaken by Golder Associates in conjunction with the CANMET Cape Breton Coal Research Laboratory (CBCRL) and the Cape Breton Development Corporation (CBDC) to measure rock deformation and support system response in the Donkin-Morien Nos. 2 and 3 tunnels (1). The final report represents a comprehensive data base and preliminary analysis of the results collected during the driving of the Donkin-Morien No. 2 tunnel using a 7.6 m diameter Lovat Tunnel Boring Machine (TBM) and the No. 3 tunnel (0 - 1027 m) using conventional drill and blast techniques.

In February 1986, two contract debriefing seminars were held, one in Sydney, N.S. and one in Ottawa. After the seminars, copies of the final report were sent to 17 Canadian university departments with mining/civil engineering (geotechnical) programs. Between February and April 1987, a series of seminars were undertaken by CANMET at the 17 Canadian universities to present the contents of the final contract report to both university staff and students as well as interested outside bodies such as mining companies, consultancy firms and regulatory officials (2). In addition to allowing 'face-to-face' question and answer sessions regarding the final report, areas of potential research were also discussed along with the mechanisms by which further studies/research could be undertaken.

Between March 1986 and February 1987, additional geotechnical monitoring was undertaken by CBCRL in conjunction with CBDC, in the TBM portion of the No. 3 tunnel (1027 - 3573 m). This document contains the data base collected in the TBM portion of the No. 3 tunnel and is intended as an addendum to the data base already presented in the Golder Associates final contract report (1). A preliminary analysis of the data base is not included in the report.

DONKIN-MORIEN DEVELOPMENT PROJECT

During the late 1970's, an extensive drilling and geophysical program by CBDC defined an offshore coal resource block in the Donkin-Morien

area of the coalfield, Figure 1. Subsequent feasibility studies resulted in the definition and implementation of the Donkin-Morien Development Project.

Within the resource block, five major coal seams have been identified as being potentially workable: Harbour, Hub, Phalen, Lloyd Cove and Point Aconi (the seam thickness varies between 1.5 and 4.5 m). The total in situ resources within the five seams is estimated to be nearly two billion tonnes.

To access the Donkin-Morien Mine resource block, two parallel tunnels (50 m centre to centre) were driven through a sedimentary sequence of interbedded sandstones, siltstones, mudstones and coal seams to intersect the Harbour Seam, approximately 3.5 km offshore. The No. 2 tunnel was driven (October 1983 to December 1984) a total distance of 3579 m using a 7.6 m diameter Lovat full face TBM and supported by circular steel arches on 1.5 m spacings (3,4). The No. 3 tunnel was initially driven a distance of 1027 m (December 1981 to February 1983) using drill and blast methods (7.6 m wide by 5.3 m high) and supported by rock bolts and shotcrete. The No. 3 tunnel was subsequently completed (March 1986 to February 1987) using the TBM to a distance of 3573 m.

PREVIOUS GEOTECHNICAL MONITORING

During the period May 1983 to December 1984, a major geotechnical research program was undertaken in the Donkin-Morien tunnels by Golder Associates in conjunction with CANMET - CBCRL and CBDC. This culminated in the submission of a final report in January 1986 entitled 'Measurement and Analysis of Rock Deformation and Support System Response in the Drill and Blast and Bored Access Drivages at the Donkin-Morien Project (UP-G198)' (1).

The research program was undertaken to monitor the performance of the No. 2 tunnel TBM and No. 3 tunnel drill and blast drivages and study both the thrusting characteristics of the TBM and the rock/support interaction of the TBM excavation (5,6). In addition to monitoring the installed support performance, which enabled changes to be made where necessary, the research program also produced a comprehensive data base on TBM excavations in coal measures strata which can be used by future mine operators and/or researchers.

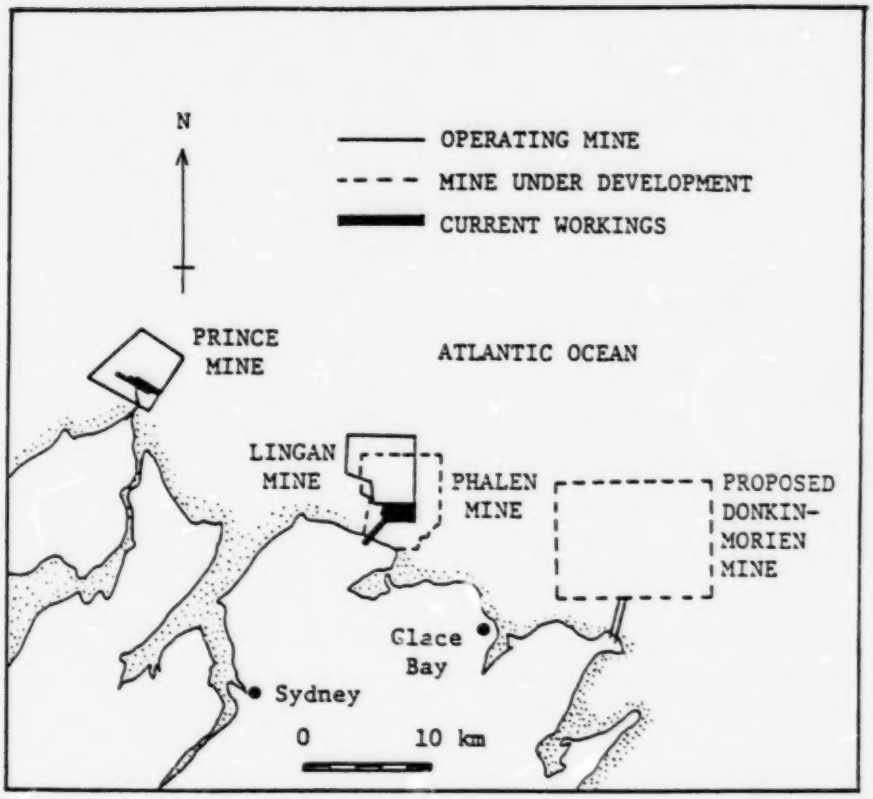


Figure 1 - Location of the Donkin-Morien Resource Block, Sydney Coalfield, N.S.

NO. 3 TBM TUNNEL

GEOLOGY

Both the No. 2 and No. 3 tunnels were driven northwards through a northerly dipping (approximately 7 to 9°) sequence of coal measures strata of Carboniferous age, Figure 2. The strata consists of interbedded sequences of sandstones, siltstones, mudstones and seatearths/coal seams of variable thickness. The No. 3 tunnel geology was found to be almost identical to that encountered in the No. 2 tunnel and a plan showing the 'as intersected geology' along the No. 2 tunnel can be found in the Golder report (1).

A legend describing the various rock types encountered in the two tunnels along with a summary of their strength and deformation properties is given in Appendix A.

SUPPORT SYSTEM

The support system used for the TBM portion of the No. 3 tunnel was identical to that used in the No. 2 tunnel and consisted of circular steel sets and thrust blocks, Figure 3. In general, the steel sets were spaced on 1.5 m centres, although in areas of potentially weak ground, such as coal seams, the spacing was reduced to 1 m centres. In the case of coal seams, the spacing was reduced to 1 m when the base of the seam was 2 m above the tunnel crown and ceased when the top of the seam was 1 m above the crown.

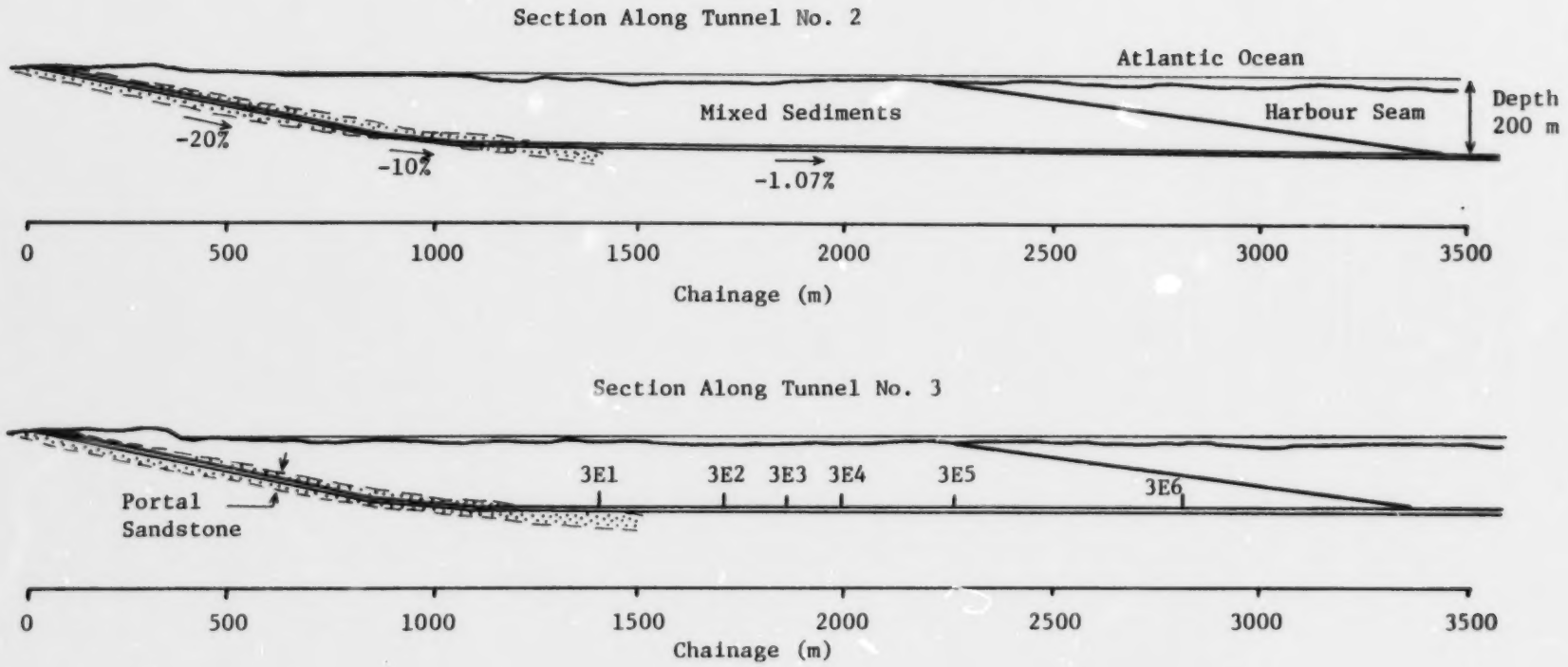
Details of the No. 3 tunnel support system components can be summarized as follows:

1) Steel Sets

W150 x 23 kg/m section (M300W) steel rolled to fit the inside diameter of the TBM shield. One complete set consisted of six equal segments. The steel sets constituted the main support elements and were spaced on 1.5 m centres (this was reduced to 1 m centres where necessary).

2) Thrust Blocks

101.6 mm x 101.6 mm x 70.3 mm Class C Hollow Structural Steel (M350W) with an allowable capacity of 540 kN. Used to maintain the thrust developed between the hydraulic jacks of the TBM and the steel sets. Twenty four were used for each steel set.



3E1 - Extensometer Site, Ch 1396 m
3E2 - Extensometer Site, Ch 1696 m
3E3 - Extensometer Site, Ch 1854 m
3E4 - Extensometer Site, Ch 1981 m
3E5 - Extensometer Site, Ch 2257 m
3E6 - Extensometer Site, Ch 2812 m

Figure 2 - Longitudinal section along Donkin-Morien tunnels showing the location of the No. 3 tunnel extensometer sites (TBM portion)

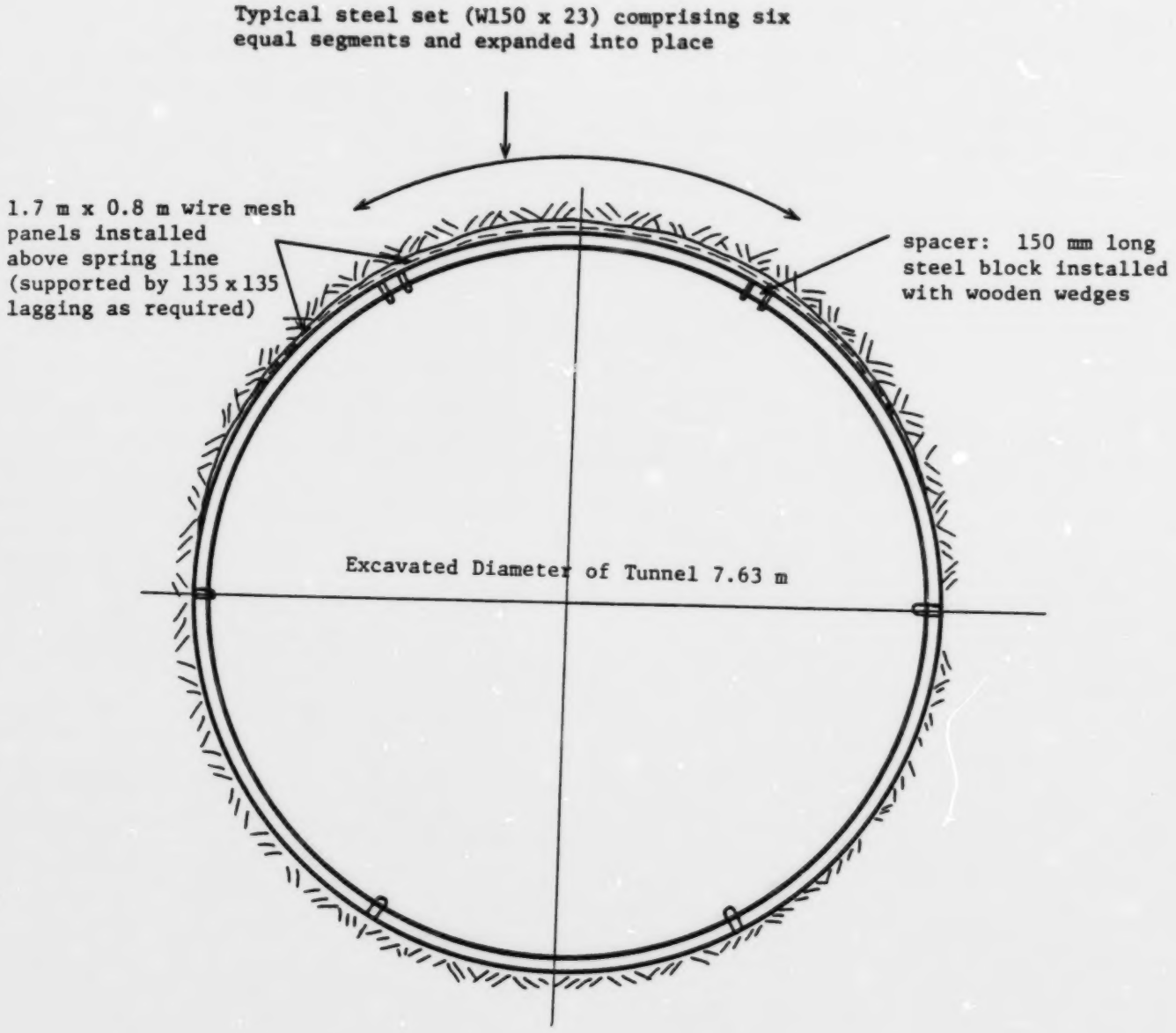

Typical steel set (W150 x 23) comprising six equal segments and expanded into place
1.7 m x 0.8 m wire mesh panels installed above spring line (supported by 135 x 135 lagging as required)
spacer: 150 mm long steel block installed with wooden wedges
Excavated Diameter of Tunnel 7.63 m

Figure 3 - No. 3 tunnel support system

3) Lagging

130 mm x 130 mm x 4.8 mm steel channel, used when required to support mesh panels in areas where excessive rock loosening was encountered in the tunnel crown. Lagging was generally placed across the top 60° of the tunnel.

4) Mesh Panels

800 mm wide x 1700 mm long galvanised steel mesh panels with the cross wires 5 mm in diameter and the long wires 8 mm in diameter. Used to support loose rock between the steel sets and installed across the top 120° of the tunnel.

INSTRUMENTATION PROGRAM

Six multiple point borehole extensometers were installed in the No. 3 tunnel (Ch 1396, 1696, 1854, 1981, 2257 and 2812 m) at locations based on anticipated geological conditions, Figure 2. All the extensometers were located in the crown of the tunnel and all, with the exception of Ch 1854, were drilled from within the head of the TBM.

It should be noted that unlike the major geotechnical program undertaken in the No. 2 tunnel, apart from the six extensometer sites, no other instrumentation was installed in the No. 3 tunnel.

IRAD GAGE FLEXIBLE SONIC PROBLE EXTENSOMETER

TECHNICAL SPECIFICATIONS

The Irad Gage Flexible Sonic Probe Multiple Point Extensometer (MPBX) was used to measure rock displacements in the crown of the tunnel. The essential features of the instrumentation can be summarised as follows:

- usually 10 anchors with the deepest at 7.6 m.
- resolution ±0.002 inch (0.05 mm)
- readout unit - Irad Gage MB-7 (certified intrinsically safe for use in coal mines)

INSTALLATION PROCEDURES

The flexible sonic probe extensometers were installed in 38 mm diameter holes drilled with a stoper using water as a flushing medium. However, some problems were encountered with the drill rods becoming stuck in the hole, due to a lack of flushing water.

Once drilled, the hole was flushed clean and the deepest C-clip anchor inserted to the required depth using insertion rods. At the required position, the C-clips were released via a pin, thereby setting the anchor in position. This procedure was then repeated for the remaining anchors to be installed in the hole (normally 10).

At present, the maximum depth of installation is limited to 7.6 m by the length of the flexible sonic probe. However, a large number of anchors can be installed which allows the detailed monitoring of discrete cracks or horizons within the strata.

Once installed, a central PVC guide tube is inserted up the hole and through the anchors. The flexible sonic probe is then inserted up the guide tube and the distance between the collar anchor and each subsequent anchor monitored using the MB-7 readout box.

Figure 4 shows the flexible sonic probe, central guide tube and anchor locations within a borehole.

DISPLACEMENT MONITORING RESULTS

Displacement monitoring of the strata above the tunnel crown was undertaken at six locations: Chainage (m) 1396, 1696, 1854, 1981, 2257 and 2812. The borehole and tunnel geology for each of the instrumented sites, along with the extensometer data in both tabulated and graphical format is presented in Appendices A to F:

Ch 1396 - Appendix A
1696 - Appendix B
1854 - Appendix C
1981 - Appendix D
2257 - Appendix E
2812 - Appendix F

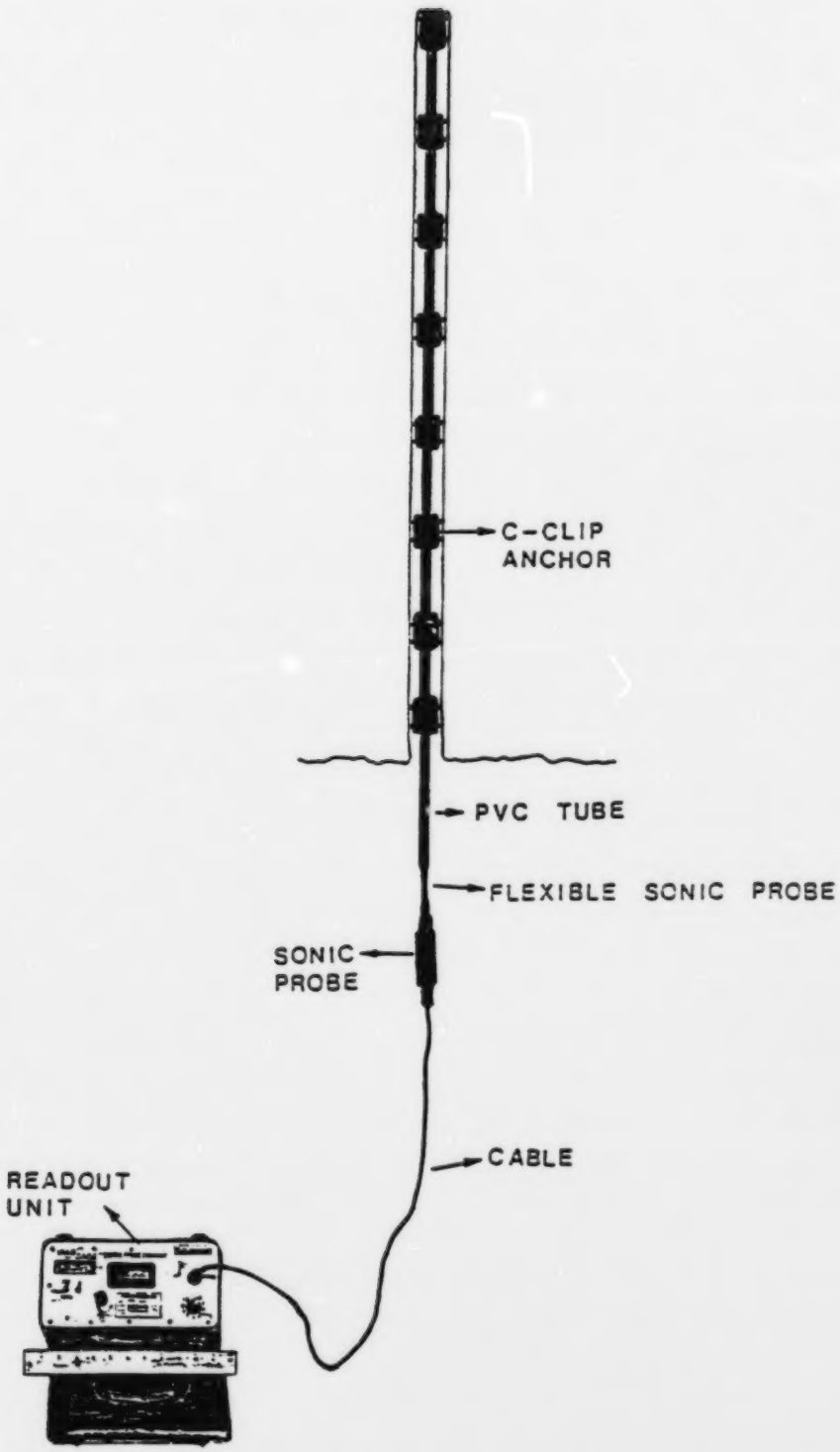


Figure 4 - Irad Gage flexible sonic probe multiple point extensometer

Each set of extensometer data includes a site reference number which comprises a tunnel number, chainage and instrument designation. The site number of the extensometer (3T1396EA) indicates the following:

3T - Tunnel 3
1396 - Chainage along Tunnel (m)
E - Extensometer
A - Location in Tunnel
A - Vertically Up (Crown)
B - Horizontal - West
C - Horizontal - East
D - Vertically Down (Floor)

Also included on each sheet is the probe and readout box serial number, the date of installation and the date and time of readings. The tunnel chainage at the time of installation and at each reading as well as the cumulative TBM advance (m) are also given.

The anchor number is identified by the following information:

A1 = 0.61 m

where, A1 - Anchor Number
0.61 - Depth from Collar of Hole

In each case, the values presented are given in millimetres (the readout box measures in inches) and the anchor movement is calculated using Equation 1:

$$D = 25.4 (r_1 - r_0) \qquad \text{Eq 1}$$

where, D - Change in Readings from Datum (mm)
25.4 - Conversion factor from inches to mm
r_1 - Readout Box Value (inches)
r_0 - Datum Value

CROSSCUT AT CHAINAGE 1863 M

At Chainage 1865 m, the main bearing failed on the TBM. In order to replace it, the face plate was bolted to the face of the tunnel and the TBM shield pulled back about 3 m. A crosscut, some 40 m in length and with dimensions of approximately 3.66 m wide by 6.10 m high, was then driven across from the No. 2 tunnel to intersect the TBM head area. The crosscut was driven using conventional drill and blast methods and supported using lagged steel arches and rock bolts (particularly at the junctions between the crosscut and the Nos. 2 and 3 tunnels). The rock bolt pattern consisted of 3.5 m long full column resin steel rebar bolts installed on 1.5 m centres.

To monitor the behaviour of the tunnel roof above the unsupported shielded section of the TBM, a 7.6 m extensometer was installed at chainage 1854 m. This was then monitored regularly during the crosscut drivage, changing of the main bearing and subsequent start-up operations. The chainage 1854 m extensometer data can be found in Appendix C.

CONCLUSION

Geotechnical monitoring undertaken in the TBM portion of the Donkin Morien No. 3 tunnel provides a valuable supplement to that already obtained from the TBM No. 2 tunnel and the drill and blast portion of the No. 3 tunnel.

A comprehensive data base containing geotechnical and rock/support interaction information now exists concerning large diameter TBM drivages through interbedded coal measures strata. It is therefore anticipated that this data will be used by both university researchers and mine operators to further improve the development and support of tunnels in weak rock conditions.

REFERENCES

1. Golder Associates "Measurement and analysis of rock deformation and support system response in the drill and blast and bored access drivages at the Donkin-Morien Project (UP-G198)". Prepared by Golder Associates (Eastern Canada) Ltd. under contract for CANMET, Ottawa (DSS File No. 26SQ.23440-2-9159); January 1986.
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3. Marsh, J.C., Currie, D., Landry, G. and Lamb, T. "Cape Breton Development Corporation's experience with a tunnel boring machine in coal measures"; CIM Bulletin; July 1986; pp. 49-55.
4. Hunter, J.A. and Lovat, R. "Design, development and verification of a Lovat 7.6 m full face tunnel boring machine"; CIM Bulletin; Vol. 77, No. 865; 1984.
5. Gilby, J.L., Yuen, C.M.K. and Aston, T.R.C. "Geotechnical monitoring of tunnel boring machine drivages at the Donkin-Morien Mine, Nova Scotia". Presented at the 89th CIM Annual General Meeting, May 3-7, 1987; Toronto.
6. Yuen, C.M.K., Boyd, J.M. and Aston, T.R.C. "Rock/support interaction study of a TBM driven tunnel at the Donkin Mine, Nova Scotia". Published Proc. 6th International Congress on Rock Mechanics; August 30 - September 3, 1987; Montreal; Vol. 2, pp. 1339-1344.

APPENDIX A

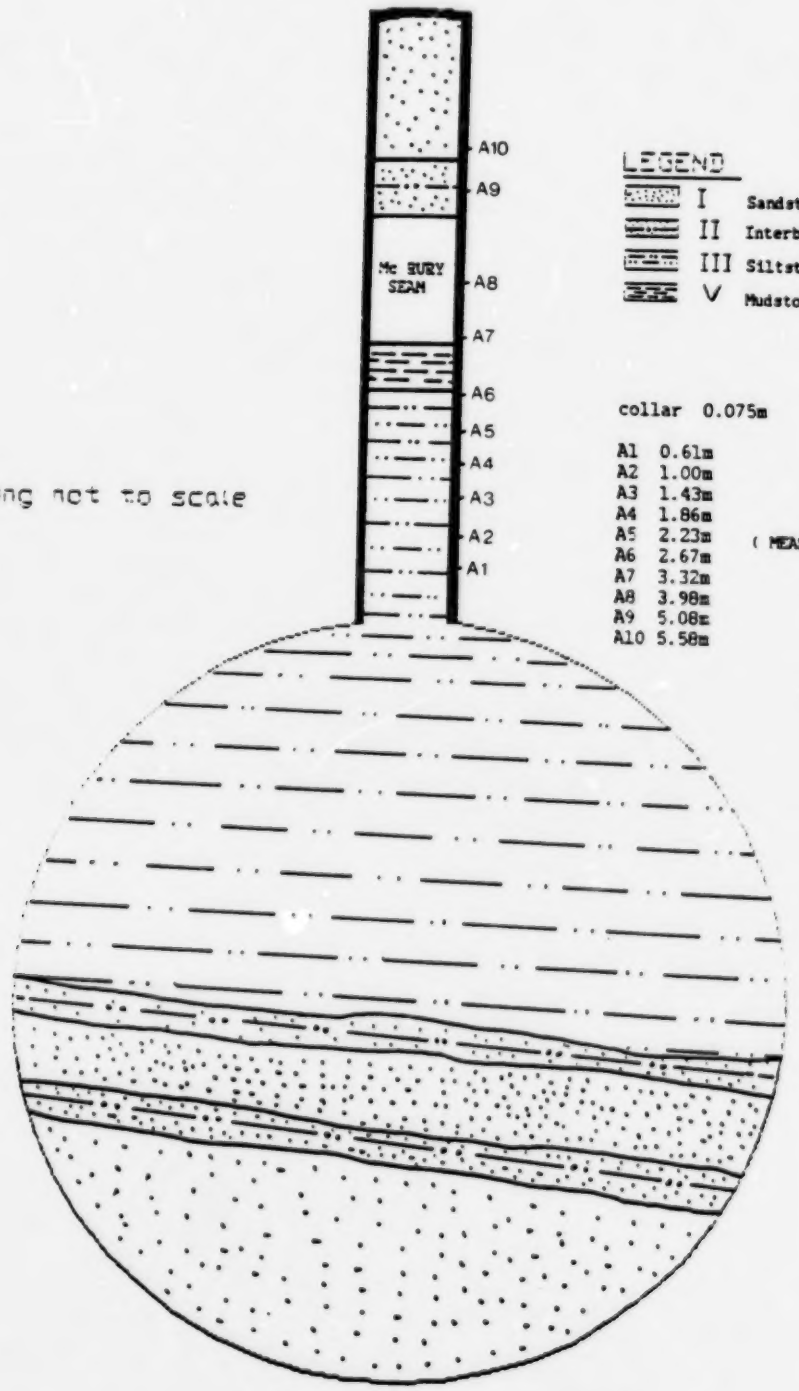
ROCK TYPE	LITHOLOGICAL DESCRIPTION
I	SANDSTONE, FRESH TO SLIGHTLY WEATHERED, LAMINATED TO THICKLY BEDDED, LIGHT GREY FINE TO COARSE GRAINED.
II	INTERBEDDED SANDSTONE/SILTSTONE, FRESH TO SLIGHTLY WEATHERED, LAMINATED TO THICKLY BEDDED, LIGHT TO DARK GREY ARGILLACEOUS SILTSTONE AND FINE GRAINED SANDSTONE FREQUENTLY INTERLAMINATED, AND OR GRADATIONALLY BEDDED.
III	SILTSTONE, FRESH TO SLIGHTLY WEATHERED, LAMINATED TO THICKLY BEDDED, LIGHT TO DARK GREY ARGILLACEOUS TO FINE GRAINED SANDY SILTSTONE WITH OCCATIONAL IRONSTONE NODULES.
IV	INTERBEDDED SANDSTONE/MUDSTONE, FRESH TO SLIGHTLY WEATHERED, LAMINATED TO THICKLY BEDDED, LIGHT TO DARK GREY MUDSTONE AND SANDY SILTSTONE FREQUENTLY INTERLAMINATED, AND OR GRADATIONALLY BEDDED, MUDSTONE FREQUENTLY FISSILE.
V	MUDSTONE, FRESH TO SLIGHTLY WEATHERED, THINLY LAMINATED TO MEDIUM BEDDED, LIGHT TO DARK GREY MUDSTONE FREQENTLY FISSILE.
VI	CARBONACEOUS MUDSTONE, FRESH TO SLIGHTLY WEATHERED, THINLY LAMINATED TO MEDIUM BEDDED, DARK GREY TO BLACK MUDSTONE CONTAINING CLASTS OR INTERBEDS OF BLACK CARBONACEOUS MUDSTONE AND/OR THINLY LAMINATED COAL.
VI A	COAL, FRESH TO FAINTLY WEATHERED, LAMINATED TO THINLY BEDDED BRIGHT BLACK CLEATED COAL, CONTAINS MINOR MUDSTONE AND CLAY PARTINGS.

Lithological Description of the Different Rock Types Encountered in the Donkin-Morien Tunnels

ROCK TYPE	UNIAXIAL COMPRESSIVE STRENGTH $\overline{\sigma c}$ (MPa)		TENSILE STRENGTH $\overline{\sigma t}$ (MPa)		DEFORMATION MODULUS E (GPa)		POISSON'S RATIO ν	
	Range	Mean	Range	Mean	Range	Mean	Range	Mean
I	44.9-145.1	93.8	5.6-9.6	7.5	13.8-43.7	34.2	0.17-0.38	0.25
II	47.9-152.8	121.3	4.7-11.9	9.0	6.6-21.9	17.6	-	-
III	13.9-68.5	53.6	1.9-4.9	3.5	4.5-25.3	11.3	-	-
IV	14.7-62.9	35.8	2.3-6.3	3.7	4-15.0	9.0	-	-
V	30.9-42.2	37.2	1.5-6.0	3.5	8.8-15.0	11.5	-	-

Summary of Strength and Deformation Properties
for the Donkin-Morien tunnel rock types

1396EA



LEGEND

I	Sandstone
II	Interbedded Sandstone/Siltstone
III	Siltstone
V	Mudstone

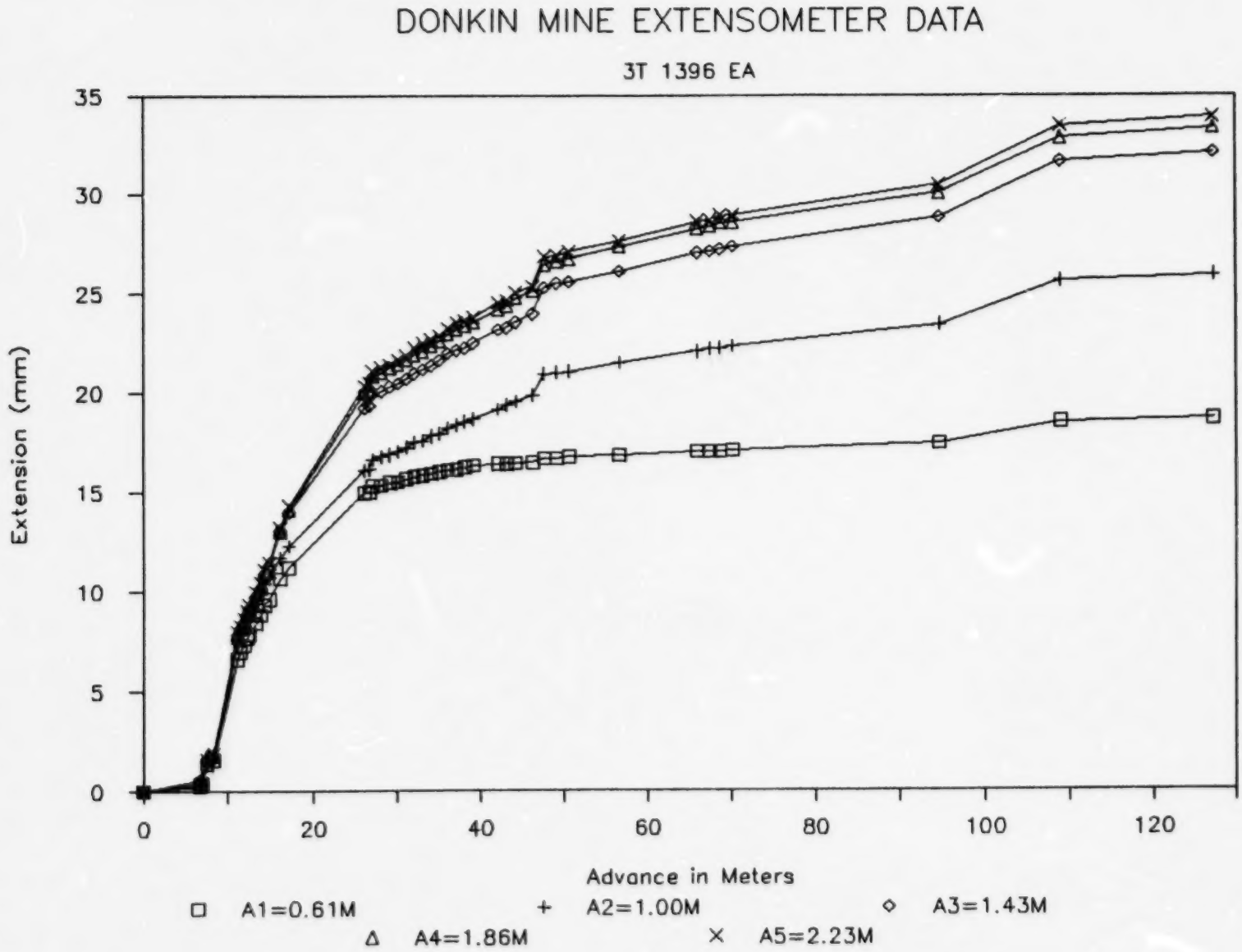
collar 0.075m

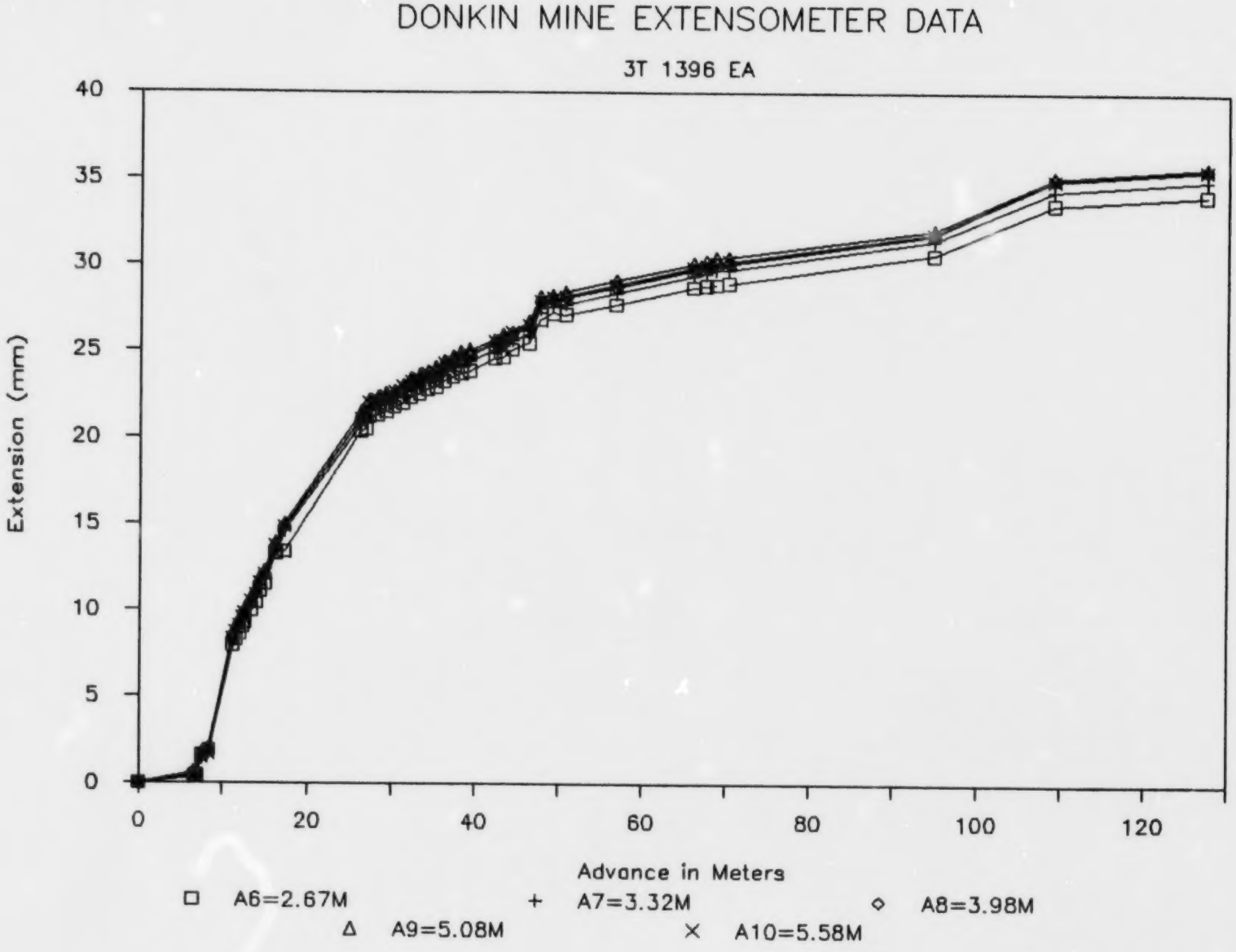
A1	0.61m
A2	1.00m
A3	1.43m
A4	1.86m
A5	2.23m
A6	2.67m
A7	3.32m
A8	3.98m
A9	5.08m
A10	5.58m

(MEASURED IN METERS)

NOTE Drawing not to scale

TUNNEL No. 3


DONKIN MINE EXTENSOMETER DATA
3T 1396 EA
Extension (mm)
35
30
25
20
15
10
5
0
0
20
40
60
80
100
120
Advance in Meters
A1=0.61M
A2=1.00M
A3=1.43M
A4=1.86M
A5=2.23M


DONKIN MINE EXTENSOMETER DATA
3T 1396 EA
Extension (mm)
0
5
10
15
20
25
30
35
40
0
20
40
60
80
100
120
Advance in Meters
A6=2.67M
A7=3.32M
A8=3.98M
A9=5.08M
A10=5.58M

DONKIN MINE @ 3 TUNNEL

EXTENSOMETER READINGS

FLEXIBLE SONIC PROBE

SITE @ 3T1396EA PROBE @ A1011RP READOUT SERIAL @ 080

DEPTH OF COLLAR ANCHOR = 0.075 M

DATE	18-Apr-86	18-Apr-86	18-Apr-86	18-Apr-86	18-Apr-86	21-Apr-86	21-Apr-86	21-Apr-86
TIME	14:30	20:50	21:10	21:55	22:25	01:45	02:15	02:40
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A1=0.61M	17.943	17.952	17.958	17.996	18.004	18.204	18.217	18.231
A2=1.00M	32.872	32.885	32.886	32.924	32.934	33.163	33.179	33.193
A3=1.43M	50.013	50.028	50.030	50.071	50.080	50.320	50.333	50.346
A4=1.86M	67.092	67.112	67.115	67.160	67.162	67.400	67.415	67.428
A5=2.23M	81.532	81.546	81.548	81.594	81.605	81.846	81.859	81.871
A6=2.67M	98.721	98.735	98.740	98.784	98.795	99.033	99.046	99.061
A7=3.32M	124.203	124.222	124.222	124.260	124.271	124.524	124.542	124.554
A8=3.98M	150.375	150.396	150.399	150.444	150.452	150.703	150.718	150.732
A9=5.08M	193.933	193.957	193.952	194.001	194.009	194.274	194.286	194.300
A10=5.58M	213.635	213.649	213.654	213.693	213.701	213.962	213.980	213.993

EXTENSION IN mm

DATE	18-Apr-86	18-Apr-86	18-Apr-86	18-Apr-86	18-Apr-86	21-Apr-86	21-Apr-86	21-Apr-86
TIME	14:30	20:50	21:10	21:55	22:25	01:45	02:25	02:40
CHAINAGE	1395.970	1402.600	1402.800	1403.500	1404.300	1407.100	1407.400	1407.900
ADVANCE M	0	6.63	6.83	7.53	8.33	11.13	11.43	11.93
A1=0.61M	0.00	0.23	0.38	1.35	1.53	6.63	6.96	7.31
A2=1.00M	0.00	0.33	0.36	1.32	1.57	7.44	7.80	8.15
A3=1.43M	0.00	0.38	0.43	1.47	1.70	7.80	8.13	8.46
A4=1.86M	0.00	0.51	0.58	1.73	1.78	7.82	8.20	8.53
A5=2.23M	0.00	0.36	0.41	1.37	1.85	7.98	8.31	8.61
A6=2.67M	0.00	0.36	0.48	1.60	1.88	7.92	8.25	8.64
A7=3.32M	0.00	0.48	0.48	1.45	1.73	8.15	8.61	8.92
A8=3.98M	0.00	0.53	0.61	1.75	1.96	8.33	8.71	9.07
A9=5.08M	0.00	0.61	0.48	1.73	1.93	8.66	8.97	9.32
A10=5.58M	0.00	0.36	0.48	1.47	1.68	8.31	8.76	9.09

DONKIN MINE @ 3 TUNNEL

EXTENSOMETER READINGS

FLEXIBLE SONIC PROBE

SITE @ 3T1396EA PROBE @ A1011RP READOUT SERIAL @ 080

DEPTH OF COLLAR ANCHOR = 0.075 M

DATE	21-Apr-86	21-Apr-86	21-Apr-86	21-Apr-86	21-Apr-86	21-Apr-86	21-Apr-86	21-Apr-86
TIME	03:18	03:48	05:05	05:40	06:27	07:00	08:00	09:00
CHAINAGE	1408.300	1408.500	1409.300	1409.900	1410.300	1410.900	1412.200	1413.200
A1=0.61M	18.245	18.253	18.275	18.290	18.311	18.321	18.362	18.385
A2=1.00M	33.209	33.219	33.242	33.261	33.283	33.293	33.333	33.356
A3=1.43M	50.361	50.373	50.399	50.415	50.443	50.458	50.528	50.565
A4=1.86M	67.445	67.455	67.481	67.499	67.524	67.541	67.605	67.648
A5=2.23M	81.888	81.900	81.926	81.943	81.969	81.983	82.053	82.096
A6=2.67M	99.077	99.088	99.113	99.133	99.159	99.174	99.243	99.248
A7=3.32M	124.570	124.582	124.608	124.625	124.649	124.666	124.734	124.777
A8=3.98M	150.749	150.761	150.786	150.806	150.832	150.849	150.913	150.957
A9=5.08M	194.318	194.328	194.355	194.375	194.398	194.416	194.482	194.524
A10=5.58M	214.010	214.020	214.048	214.065	214.091	214.109	214.175	214.218

EXTENSION IN mm

DATE	21-Apr-86	21-Apr-86	21-Apr-86	21-Apr-86	21-Apr-86	21-Apr-86	21-Apr-86	21-Apr-86
TIME	03:18	03:48	05:05	05:40	06:27	07:00	08:00	09:00
CHAINAGE	1408.300	1408.500	1409.300	1409.900	1410.300	1410.900	1412.200	1413.200
ADVANCE M	12.33	12.53	13.33	13.93	14.33	14.93	16.23	17.23
A1=0.61M	7.67	7.87	8.43	8.81	9.35	9.60	10.64	11.23
A2=1.00M	8.56	8.81	9.40	9.88	10.44	10.69	11.71	12.29
A3=1.43M	8.84	9.14	9.80	10.21	10.92	11.30	13.08	14.02
A4=1.86M	8.97	9.22	9.88	10.34	10.97	11.40	13.03	14.12
A5=2.23M	9.04	9.35	10.01	10.44	11.10	11.46	13.23	14.33
A6=2.67M	9.04	9.32	9.96	10.46	11.12	11.51	13.26	13.39
A7=3.32M	9.32	9.63	10.29	10.72	11.33	11.76	13.49	14.58
A8=3.98M	9.30	9.80	10.44	10.95	11.61	12.04	13.67	14.78
A9=5.08M	9.78	10.03	10.72	11.23	11.81	12.27	13.94	15.01
A10=5.58M	9.52	9.78	10.49	10.92	11.58	12.04	13.72	14.81

DONKIN MINE @ 3 TUNNEL

EXTENSOMETER READINGS

FLEXIBLE SONIC PROBE

SITE @ 3T1396EA PROBE @ A1011RP READOUT SERIAL @ 080

DEPTH OF COLLAR ANCHOR = 0.075 M

DATE	22-Apr-86	22-Apr-86	22-Apr-86	22-Apr-86	22-Apr-86	22-Apr-86	22-Apr-86	22-Apr-86
TIME	07:35	08:15	12:00	12:50	13:40	14:30	15:20	16:30
CHAINAGE	1422.200	1422.800	1423.200	1424.200	1425.200	1426.200	1427.200	1428.200
A1=0.61M	18.533	18.535	18.546	18.548	18.554	18.555	18.560	18.565
A2=1.00M	33.506	33.509	33.528	33.534	33.539	33.545	33.552	33.562
A3=1.43M	50.772	50.775	50.800	50.805	50.814	50.820	50.829	50.840
A4=1.86M	67.881	67.885	67.913	67.920	67.930	67.936	67.946	67.956
A5=2.23M	82.334	82.340	82.364	82.370	82.375	82.386	82.395	82.409
A6=2.67M	99.521	99.526	99.556	99.559	99.567	99.577	99.585	99.600
A7=3.32M	125.019	125.025	125.055	125.060	125.068	125.080	125.085	125.100
A8=3.98M	151.203	151.206	151.237	151.244	151.253	151.260	151.271	151.285
A9=5.08M	194.776	194.776	194.805	194.813	194.821	194.826	194.839	194.855
A10=5.58M	214.464	214.468	214.500	214.505	214.515	214.525	214.539	214.548

EXTENSION IN mm

DATE	22-Apr-86	22-Apr-86	22-Apr-86	22-Apr-86	22-Apr-86	22-Apr-86	22-Apr-86	22-Apr-86
TIME	07:35	08:15	12:00	12:50	13:40	14:30	15:20	16:30
CHAINAGE	1422.200	1422.800	1423.200	1424.200	1425.200	1426.200	1427.200	1428.200
ADVANCE M	26.23	26.83	27.23	28.23	29.23	30.23	31.23	32.23
A1=0.61M	14.99	15.04	15.32	15.37	15.52	15.54	15.67	15.80
A2=1.00M	16.10	16.18	16.66	16.81	16.94	17.09	17.27	17.53
A3=1.43M	19.28	19.35	19.99	20.12	20.34	20.50	20.73	21.01
A4=1.86M	20.04	20.14	20.85	21.03	21.28	21.44	21.69	21.95
A5=2.23M	20.37	20.52	21.13	21.28	21.41	21.69	21.92	22.28
A6=2.67M	20.32	20.45	21.21	21.28	21.49	21.74	21.95	22.33
A7=3.32M	20.73	20.88	21.64	21.77	21.97	22.28	22.40	22.78
A8=3.98M	21.03	21.11	21.89	22.07	22.30	22.48	22.76	23.11
A9=5.08M	21.41	21.41	22.15	22.35	22.56	22.68	23.01	23.42
A10=5.58M	21.06	21.16	21.97	22.10	22.35	22.61	22.96	23.19

DONKIN MINE # 3 TUNNEL

EXTENSOMETER READINGS

FLEXIBLE SONIC PROBE

SITE # 3T1396EA PROBE # A1011RP READOUT SERIAL # 080

DEPTH OF COLLAR ANCHOR = 0.075 M

DATE	22-Apr-86	22-Apr-86	22-Apr-86	22-Apr-86	22-Apr-86	22-Apr-86	22-Apr-86	23-Apr-86
TIME	17:20	18:30	19:15	20:30	21:35	22:25	23:15	02:30
CHAINAGE	1429.200	1430.200	1431.200	1432.200	1433.200	1434.200	1435.200	1438.200
A1=0.61M	18.568	18.571	18.575	18.578	18.580	18.584	18.588	18.590
A2=1.00M	33.565	33.576	33.580	33.591	33.597	33.603	33.608	33.628
A3=1.43M	50.848	50.855	50.866	50.880	50.886	50.890	50.900	50.926
A4=1.86M	67.963	67.973	67.983	67.996	68.005	68.013	68.020	68.045
A5=2.23M	82.418	82.426	82.434	82.448	82.460	82.463	82.470	82.499
A6=2.67M	99.606	99.618	99.623	99.637	99.646	99.655	99.660	99.688
A7=3.32M	125.106	125.120	125.124	125.142	125.149	125.155	125.165	125.188
A8=3.98M	151.292	151.300	151.312	151.327	151.333	151.340	151.350	151.377
A9=5.08M	194.862	194.870	194.880	194.895	194.905	194.915	194.920	194.943
A10=5.58M	214.555	214.566	214.571	214.590	214.595	214.604	214.611	214.640

EXTENSION IN mm

DATE	22-Apr-86	22-Apr-86	22-Apr-86	22-Apr-86	22-Apr-86	22-Apr-86	22-Apr-86	23-Apr-86
TIME	17:20	18:30	19:15	20:30	21:35	22:25	23:15	02:30
CHAINAGE	1429.200	1430.200	1431.200	1432.200	1433.200	1434.200	1435.200	1438.200
ADVANCE M	33.23	34.23	35.23	36.23	37.23	38.23	39.23	42.23
A1=0.61M	15.87	15.95	16.05	16.13	16.18	16.28	16.38	16.43
A2=1.00M	17.60	17.88	17.98	18.26	18.41	18.57	18.69	19.20
A3=1.43M	21.21	21.39	21.67	22.02	22.17	22.28	22.53	23.19
A4=1.86M	22.12	22.38	22.63	22.96	23.19	23.39	23.57	24.21
A5=2.23M	22.50	22.71	22.91	23.27	23.57	23.65	23.82	24.36
A6=2.67M	22.48	22.78	22.91	23.27	23.49	23.72	23.85	24.36
A7=3.32M	22.94	23.29	23.39	23.85	24.03	24.18	24.43	25.02
A8=3.98M	23.29	23.49	23.80	24.18	24.33	24.51	24.76	25.45
A9=5.08M	23.60	23.80	24.05	24.43	24.69	24.94	25.07	25.65
A10=5.58M	23.37	23.65	23.77	24.26	24.38	24.61	24.79	25.53

DONKIN MINE @ 3 TUNNEL

EXTENSOMETER READINGS

FLEXIBLE SONIC PROBE

SITE @ 3T1396EA PROBE @ A1011RP READOUT SERIAL @ 080

DEPTH OF COLLAR ANCHOR = 0.075 M

DATE	23-Apr-86	23-Apr-86	23-Apr-86	23-Apr-86	23-Apr-86	23-Apr-86	23-Apr-86	24-Apr-86
TIME	03:30	05:30	07:15	14:35	15:30	16:40	21:40	06:00
CHAINAGE	1439.200	1440.300	1442.300	1443.700	1445.200	1446.700	1452.700	1462.000
A1=0.61M	18.591	18.592	18.594	18.602	18.602	18.605	18.608	18.616
A2=1.00M	33.636	33.644	33.656	33.698	33.700	33.703	33.721	33.743
A3=1.43M	50.930	50.942	50.958	51.010	51.018	51.022	51.042	51.079
A4=1.86M	68.052	68.068	68.082	68.135	68.140	68.146	68.170	68.205
A5=2.23M	82.503	82.519	82.532	82.590	82.593	82.600	82.622	82.660
A6=2.67M	99.692	99.710	99.725	99.780	99.794	99.790	99.813	99.852
A7=3.32M	125.199	125.212	125.227	125.286	125.290	125.295	125.320	125.361
A8=3.98M	151.386	151.400	151.414	151.472	151.476	151.484	151.506	151.547
A9=5.08M	194.954	194.960	194.986	195.043	195.046	195.053	195.080	195.118
A10=5.58M	214.644	214.663	214.678	214.733	214.741	214.745	214.772	214.812

EXTENSION IN mm

DATE	23-Apr-86	23-Apr-86	23-Apr-86	23-Apr-86	23-Apr-86	23-Apr-86	23-Apr-86	24-Apr-86
TIME	03:30	05:30	07:15	14:35	15:30	16:40	21:40	06:00
CHAINAGE	1439.200	1440.300	1442.300	1443.700	1445.200	1446.700	1452.700	1462.000
ADVANCE M	43.23	44.33	46.33	47.73	49.23	50.73	56.73	66.03
A1=0.61M	16.46	16.48	16.54	16.74	16.74	16.81	16.89	17.09
A2=1.00M	19.41	19.61	19.91	20.98	21.03	21.11	21.56	22.12
A3=1.43M	23.29	23.60	24.00	25.32	25.53	25.63	26.14	27.08
A4=1.86M	24.38	24.79	25.15	26.49	26.62	26.77	27.38	28.27
A5=2.23M	24.66	25.07	25.40	26.87	26.95	27.13	27.69	28.65
A6=2.67M	24.66	25.12	25.50	26.90	27.25	27.15	27.74	28.73
A7=3.32M	25.30	25.63	26.01	27.51	27.61	27.74	28.37	29.41
A8=3.98M	25.68	26.03	26.39	27.86	27.97	28.17	28.73	29.77
A9=5.08M	25.93	26.09	26.75	28.19	28.27	28.45	29.13	30.10
A10=5.58M	25.63	26.11	26.49	27.89	28.09	28.19	28.88	29.90

DONKIN MINE @ 3 TUNNEL

EXTENSOMETER READINGS

FLEXIBLE SONIC PROBE

SITE @ 3T1396EA PROBE @ A1011RP READOUT SERIAL @ 080

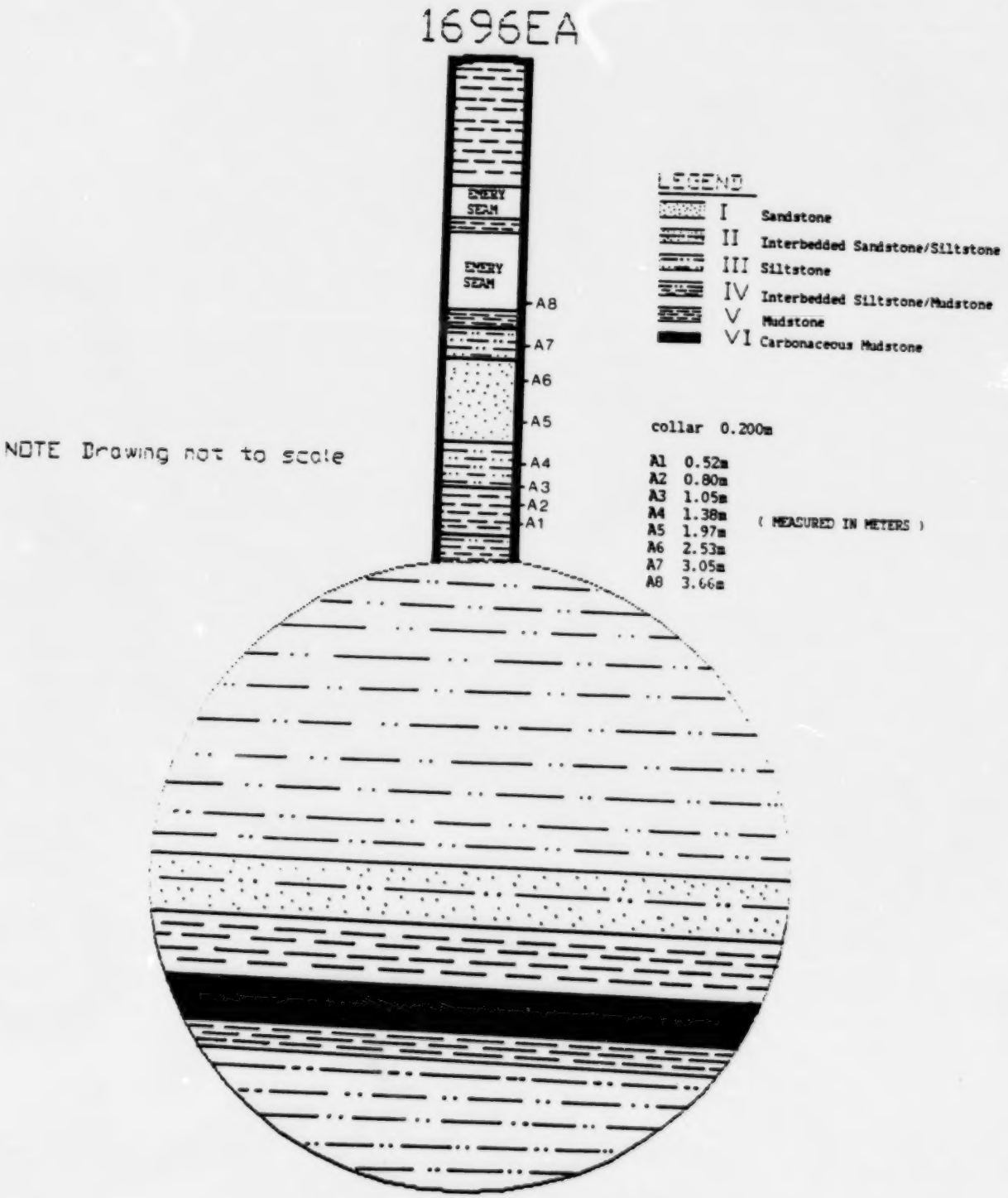
DEPTH OF COLLAR ANCHOR = 0.075 M

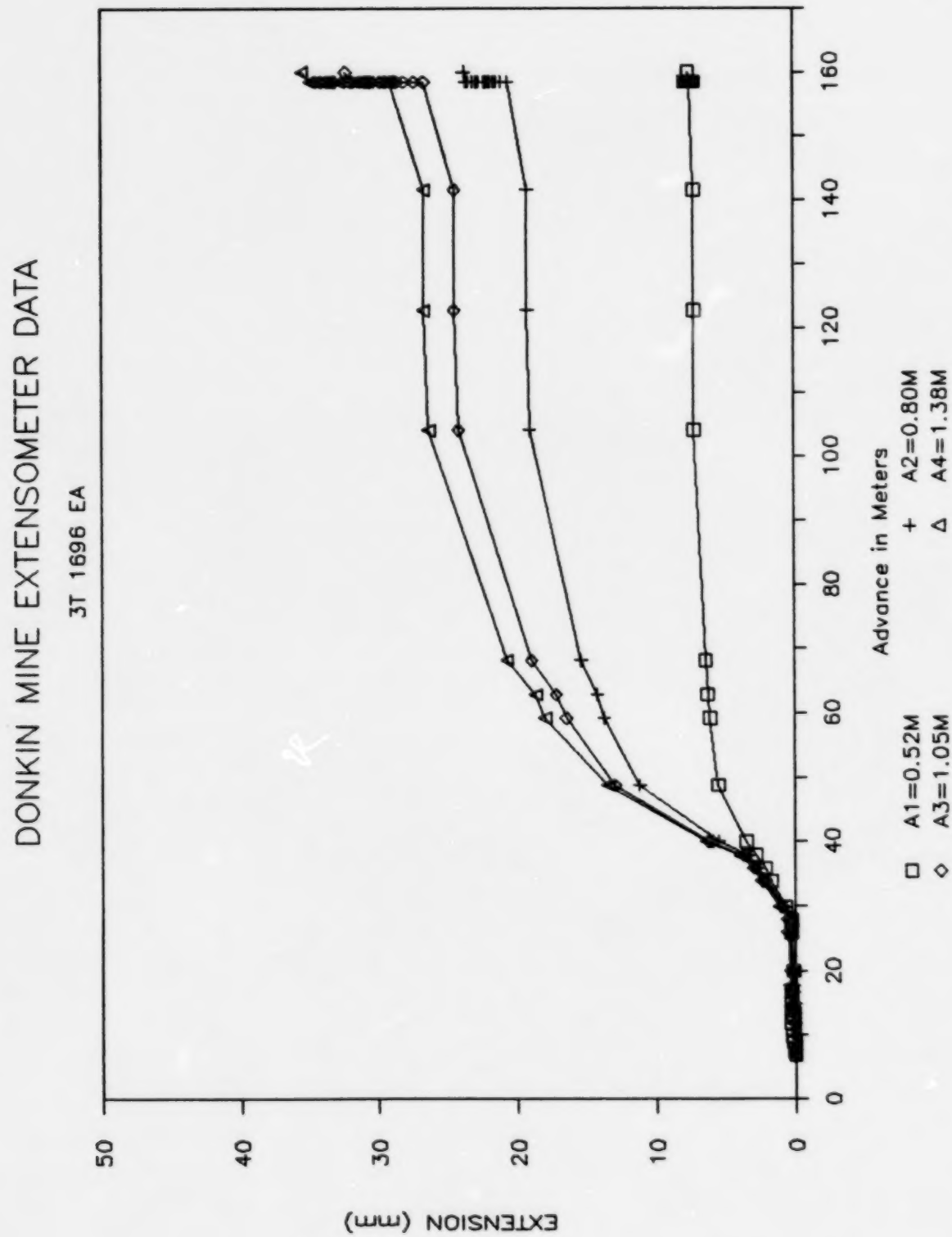
DATE	24-Apr-86	24-Apr-86	24-Apr-86	25-Apr-86	29-Apr-86	30-Apr-86
TIME	07:05	08:10	09:00	10:00	02:15	10:15
CHAINAGE	1463.500	1464.700	1466.200	1490.700	1505.000	1523.300
A1=0.61M	18.616	18.616	18.617	18.632	18.674	18.679
A2=1.00M	33.748	33.749	33.753	33.796	33.882	33.893
A3=1.43M	51.082	51.086	51.091	51.150	51.260	51.277
A4=1.86M	68.210	68.216	68.218	68.276	68.385	68.404
A5=2.23M	82.663	82.671	82.673	82.732	82.850	82.867
A6=2.67M	99.856	99.858	99.862	99.926	100.041	100.063
A7=3.32M	125.366	125.374	125.375	125.441	125.555	125.577
A8=3.98M	151.551	151.562	151.560	151.626	151.756	151.776
A9=5.08M	195.124	195.132	195.132	195.194	195.315	195.337
A10=5.58M	214.817	214.820	214.826	214.888	215.010	215.034

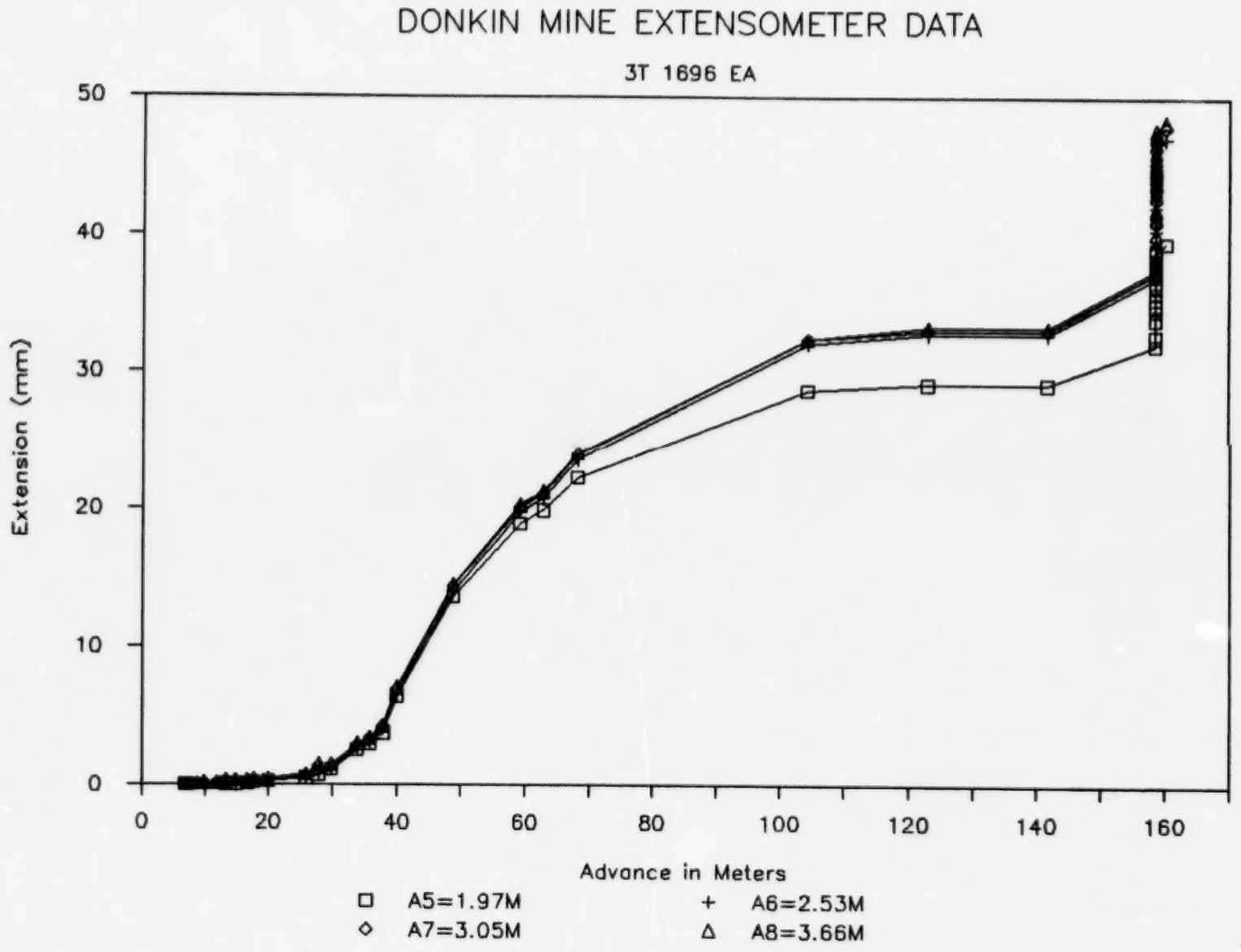
EXTENSION IN mm

DATE	24-Apr-86	24-Apr-86	24-Apr-86	25-Apr-86	29-Apr-86	30-Apr-86
TIME	07:05	08:10	09:00	10:00	02:15	10:15
CHAINAGE	1463.500	1464.700	1466.200	1490.700	1505.000	1523.300
ADVANCE M	67.53	68.73	70.23	94.73	109.03	127.33
A1=0.61M	17.09	17.09	17.12	17.50	18.57	18.69
A2=1.00M	22.25	22.28	22.38	23.47	25.65	25.93
A3=1.43M	27.15	27.25	27.38	28.88	31.67	32.11
A4=1.86M	28.40	28.55	28.60	30.07	32.84	33.32
A5=2.23M	28.73	28.93	28.98	30.48	33.48	33.91
A6=2.67M	28.83	28.88	28.98	30.61	33.53	34.09
A7=3.32M	29.54	29.74	29.77	31.45	34.34	34.90
A8=3.98M	29.87	30.15	30.10	31.78	35.08	35.39
A9=5.08M	30.25	30.45	30.45	32.03	35.10	35.66
A10=5.58M	30.02	30.10	30.25	31.83	34.92	35.53

APPENDIX B


1696EA
ENERY SEAM
ENERY SEAM
A8
A7
A6
A5
A4
A3
A2
A1
LEGEND
I Sandstone
II Interbedded Sandstone/Siltstone
III Siltstone
IV Interbedded Siltstone/Mudstone
V Mudstone
VI Carbonaceous Mudstone
collar 0.200m
A1 0.52m
A2 0.80m
A3 1.05m
A4 1.38m
A5 1.97m
A6 2.53m
A7 3.05m
A8 3.66m
(MEASURED IN METERS)
NOTE Drawing not to scale
TUNNEL No. 3


DONKIN MINE EXTENSOMETER DATA
3T 1696 EA
EXTENSION (mm)
0
10
20
30
40
50
0
20
40
60
80
100
120
140
160
Advance in Meters
A1=0.52M
A2=0.80M
A3=1.05M
A4=1.38M


DONKIN MINE EXTENSOMETER DATA
3T 1696 EA
Extension (mm)
50
40
30
20
10
0
0
20
40
60
80
100
120
140
160
Advance in Meters
A5=1.97M
A6=2.53M
A7=3.05M
A8=3.66M

DONKIN MINE @ 3 TUNNEL

EXTENSOMETER READINGS

FLEXIBLE SONIC PROBE

SITE @ 3T1696EA PROBE @ A1011RP READOUT SERIAL @ 000

DEPTH OF COLLAR ANCHOR = 0.200 M READOUT IN inches

DATE	13-May-86	13-May-86	13-May-86	13-May-86	14-May-86	14-May-86	14-May-86	14-May-86
TIME	18:45	19:10	22:00	22:50	01:15	02:50	03:33	05:00
CHAINAGE	1702.000	1703.2	1704.740	1705.740	1707.740	1709.140	1709.140	1710.740
A1=0.52M	12.465	12.469	12.472	12.473	12.475	12.473	12.475	12.475
A2=0.88M	23.719	23.715	23.722	23.724	23.725	23.720	23.722	23.719
A3=1.05M	33.681	33.678	33.675	33.677	33.681	33.683	33.682	33.686
A4=1.38M	46.429	46.429	46.429	46.431	46.434	46.434	46.436	46.439
A5=1.97M	69.609	69.609	69.607	69.607	69.605	69.610	69.613	69.610
A6=2.53M	91.741	91.740	91.740	91.743	91.746	91.746	91.715	91.748
A7=3.05M	112.290	112.290	112.290	112.292	112.294	112.292	112.297	112.298
A8=3.66M	136.399	136.393	136.402	136.404	136.403	136.410	136.410	136.412

EXTENSION IN mm

DATE	13-May-86	13-May-86	13-May-86	13-May-86	14-May-86	14-May-86	14-May-86	14-May-86
TIME	18:45	19:10	22:00	22:50	01:15	02:50	03:33	05:00
CHAINAGE	1702.000	1703.2	1704.740	1705.740	1707.740	1709.140	1709.140	1710.740
ADVANCE M	6.86	7.26	8.8	9.8	11.8	13.2	13.2	14.8
A1=0.52M	0.00	0.10	0.18	0.20	0.25	0.20	0.25	0.25
A2=0.88M	0.00	-0.10	0.00	0.13	0.15	0.03	0.00	0.00
A3=1.05M	0.00	-0.00	-0.15	-0.10	0.00	0.05	0.03	0.13
A4=1.38M	0.00	0.00	0.00	0.05	0.13	0.13	0.10	0.25
A5=1.97M	0.00	0.00	-0.05	-0.05	-0.10	0.03	0.10	0.03
A6=2.53M	0.00	-0.03	-0.03	0.05	0.13	0.13	-0.66	0.10
A7=3.05M	0.00	0.00	0.00	0.05	0.10	0.05	0.10	0.20
A8=3.66M	0.00	-0.15	0.00	0.13	0.10	0.20	0.20	0.33

DONKIN MINE # 3 TUNNEL

EXTENSOMETER READINGS

FLEXIBLE SONIC PROBE

SITE # 3T1696EA PROBE # A1011RP READOUT SERIAL # 000

DEPTH OF COLLAR ANCHOR = 0.200 M READOUT IN inches

DATE	14-May-86	14-May-86	14-May-86	14-May-86	14-May-86	14-May-86	15-May-86	15-May-86
TIME	06:20	07:44	10:40	18:05	20:00	22:20	02:00	03:50
CHAINAGE	1712.540	1713.500	1715.790	1721.740	1723.740	1725.740	1729.740	1731.740
A1=0.52M	12.475	12.412	12.470	12.475	12.475	12.492	12.533	12.549
A2=0.88M	23.721	23.724	23.723	23.732	23.740	23.753	23.802	23.825
A3=1.05M	33.689	33.687	33.687	33.698	33.702	33.720	33.772	33.795
A4=1.38M	46.439	46.443	46.441	46.450	46.450	46.473	46.523	46.547
A5=1.97M	69.613	69.615	69.618	69.628	69.636	69.652	69.700	69.726
A6=2.53M	91.747	91.747	91.751	91.765	91.770	91.790	91.843	91.864
A7=3.05M	112.296	112.302	112.306	112.317	112.342	112.342	112.403	112.422
A8=3.66M	136.412	136.415	136.415	136.428	136.456	136.456	136.515	136.533

EXTENSION IN mm

DATE	14-May-86	14-May-86	14-May-86	14-May-86	14-May-86	14-May-86	15-May-86	15-May-86
TIME	06:20	07:44	10:40	18:05	20:00	22:20	02:00	03:50
CHAINAGE	1712.540	1713.500	1715.790	1721.740	1723.740	1725.740	1729.740	1731.740
ADVANCE M	16.6	17.56	19.85	25.8	27.8	29.8	33.8	35.8
A1=0.52M	0.25	-1.35	0.13	0.25	0.25	0.69	1.73	2.13
A2=0.88M	0.85	0.13	0.10	0.33	0.53	0.86	2.11	2.69
A3=1.05M	0.20	0.15	0.15	0.43	0.53	0.99	2.31	2.90
A4=1.38M	0.25	0.36	0.30	0.53	0.53	1.12	2.39	3.00
A5=1.97M	0.10	0.15	0.23	0.48	0.69	1.09	2.51	2.97
A6=2.53M	0.15	0.15	0.25	0.61	0.74	1.24	2.59	3.12
A7=3.05M	0.15	0.30	0.41	0.69	1.32	1.32	2.87	3.35
A8=3.66M	0.33	0.41	0.41	0.74	1.45	1.45	2.95	3.48

DONKIN MINE @ 3 TUNNEL

EXTENSOMETER READINGS

FLEXIBLE SONIC PROBE

SITE @ 3T1696EA PROBE @ A1011RP READOUT SERIAL @ 000

DEPTH OF COLLAR ANCHOR = 0.200 M READOUT IN inches

DATE	15-May-86	15-May-86	15-May-86	16-May-86	16-May-86	16-May-86	21-May-86	22-May-86
TIME	06:20	11:05	20:15	06:20	10:20	17:30	10:00	10:30
CHAINAGE	1733.740	1735.890	1744.640	1755.140	1758.740	1764.140	1799.990	1818.790
A1=0.52M	12.573	12.683	12.682	12.705	12.711	12.717	12.748	12.748
A2=0.80M	23.852	23.933	24.158	24.258	24.279	24.323	24.467	24.476
A3=1.05M	33.825	33.926	34.190	34.328	34.356	34.427	34.631	34.646
A4=1.38M	46.583	46.680	46.958	47.136	47.163	47.244	47.465	47.480
A5=1.97M	69.757	69.861	70.146	70.355	70.393	70.486	70.738	70.758
A6=2.53M	91.980	92.080	92.291	92.519	92.558	92.671	93.004	93.032
A7=3.05M	112.457	112.560	112.855	113.081	113.123	113.232	113.564	113.592
A8=3.66M	136.567	136.679	136.970	137.200	137.238	137.346	137.675	137.709

EXTENSION IN mm

DATE	15-May-86	15-May-86	15-May-86	16-May-86	16-May-86	16-May-86	21-May-86	22-May-86
TIME	06:20	11:05	20:15	06:20	10:20	17:30	10:00	10:30
CHAINAGE	1733.740	1735.890	1744.640	1755.140	1758.740	1764.140	1799.990	1818.790
ADVANCE M	37.8	39.95	48.7	59.2	62.8	68.2	104.05	122.85
A1=0.52M	2.74	3.51	5.51	6.10	6.25	6.48	7.19	7.19
A2=0.80M	3.38	5.44	11.15	13.69	14.22	15.34	19.00	19.23
A3=1.05M	3.66	6.22	12.93	16.43	17.14	18.95	24.13	24.51
A4=1.38M	3.91	6.37	13.44	17.96	18.64	20.70	26.31	26.70
A5=1.97M	3.76	6.40	13.64	18.95	19.91	22.28	28.68	29.18
A6=2.53M	4.84	6.58	13.97	19.76	20.75	23.62	32.88	32.79
A7=3.05M	4.24	6.86	14.35	20.89	21.16	23.93	32.36	33.07
A8=3.66M	4.27	7.11	14.58	20.34	21.31	24.05	32.41	33.27

DONKIN MINE @ 3 TUNNEL

EXTENSOMETER READINGS

FLEXIBLE SONIC PROBE

SITE @ 3T1696EA PROBE @ A1011RP READOUT SERIAL @ 000

DEPTH OF COLLAR ANCHOR = 0.200 M READOUT IN inches

DATE	23-May-86	28-May-86	02-Jun-86	06-Jun-86	10-Jun-86	13-Jun-86	17-Jun-86	24-Jun-86
TIME	09:00	10:30	10:30	10:35	10:35	10:05	10:05	10:15
CHAINAGE	1837.490	1854.390	1854.390	1854.390	1854.390	1854.390	1854.390	1854.390
A1=0.52M	12.748	12.761	12.754	12.754	12.754	12.757	12.750	12.756
A2=0.80M	24.476	24.531	24.551	24.563	24.572	24.583	24.581	24.592
A3=1.05M	34.646	34.729	34.757	34.786	34.806	34.822	34.818	34.838
A4=1.38M	47.480	47.575	47.605	47.636	47.661	47.674	47.674	47.703
A5=1.97M	70.758	70.871	70.896	70.946	70.971	70.987	70.988	71.019
A6=2.53M	93.032	93.196	93.237	93.295	93.331	93.356	93.358	93.396
A7=3.05M	113.592	113.758	113.793	113.860	113.901	113.923	113.927	113.968
A8=3.66M	137.709	137.876	137.915	137.978	138.021	138.043	138.049	138.090

EXTENSION IN mm

DATE	23-May-86	28-May-86	02-Jun-86	06-Jun-86	10-Jun-86	13-Jun-86	17-Jun-86	24-Jun-86
TIME	09:00	10:30	10:30	10:35	10:35	10:05	10:05	10:15
CHAINAGE	1837.490	1854.390	1854.390	1854.390	1854.390	1854.390	1854.390	1854.390
ADVANCE M	141.55	158.45	158.45	158.45	158.45	158.45	158.45	158.45
A1=0.52M	7.19	7.52	7.34	7.34	7.34	7.42	7.24	7.39
A2=0.80M	19.23	20.62	21.13	21.44	21.67	21.95	21.89	22.17
A3=1.05M	24.51	26.62	27.33	28.07	28.57	28.98	28.88	29.39
A4=1.38M	26.70	29.11	29.87	30.66	31.29	31.62	31.62	32.36
A5=1.97M	29.18	32.05	32.69	33.96	34.59	35.00	35.03	35.81
A6=2.53M	32.79	36.96	38.00	39.47	40.39	41.02	41.07	42.04
A7=3.05M	33.07	37.29	38.18	39.88	40.92	41.48	41.58	42.62
A8=3.66M	33.27	37.52	38.51	40.11	41.20	41.76	41.91	42.95

DONKIN MINE # 3 TUNNEL

EXTENSOMETER READINGS

FLEXIBLE SONIC PROBE

SITE # 3T1696EA PROBE # A1011RP READOUT SERIAL # 000

DEPTH OF COLLAR ANCHOR = 0.200 M READOUT IN inches

DATE	03-Jul-86	10-Jul-86	14-Jul-86	17-Jul-86	22-Jul-86	24-Jul-86	29-Jul-86	07-Aug-86
TIME	09:50	10:00	10:35	11:00	10:45	11:30	10:15	10:00
CHAINAGE	1854.390	1854.390	1854.390	1854.390	1854.390	1854.390	1854.390	1854.390
A1=0.52M	12.754	12.747	12.762	12.772	12.763	12.751	12.753	12.750
A2=0.80M	24.597	24.595	24.615	24.615	24.620	24.613	24.617	24.620
A3=1.05M	34.853	34.855	34.883	34.881	34.888	34.880	34.890	34.896
A4=1.38M	47.717	47.718	47.747	47.745	47.752	47.750	47.758	47.767
A5=1.97M	71.836	71.845	71.871	71.870	71.878	71.873	71.882	71.896
A6=2.53M	93.424	93.432	93.467	93.469	93.480	93.477	93.493	93.511
A7=3.05M	113.997	114.005	114.040	114.038	114.053	114.050	114.072	114.090
A8=3.66M	138.121	138.129	138.164	138.161	138.180	138.175	138.194	138.214

EXTENSION mm

DATE	03-Jul-86	10-Jul-86	14-Jul-86	17-Jul-86	22-Jul-86	24-Jul-86	29-Jul-86	07-Aug-86
TIME	09:50	10:00	10:35	11:00	10:45	11:30	10:15	10:00
CHAINAGE	1854.390	1854.390	1854.390	1854.390	1854.390	1854.390	1854.390	1854.390
ADVANCE M	158.45	158.45	158.45	158.45	158.45	158.45	158.45	158.45
A1=0.52M	7.34	7.16	7.54	7.80	7.57	7.26	7.31	7.24
A2=0.80M	22.38	22.25	22.76	22.76	22.89	22.71	22.81	22.89
A3=1.05M	29.77	29.82	30.53	30.48	30.66	30.45	30.71	30.86
A4=1.38M	32.72	32.74	33.48	33.43	33.60	33.55	33.76	33.98
A5=1.97M	36.25	36.47	37.13	37.11	37.31	37.19	37.41	37.77
A6=2.53M	42.75	42.95	43.84	43.89	44.17	44.09	44.50	44.96
A7=3.05M	43.36	43.56	44.45	44.40	44.78	44.78	45.26	45.72
A8=3.66M	43.74	43.94	44.83	44.75	45.24	45.11	45.59	46.10

DONKIN MINE @ 3 TUNNEL

EXTENSOMETER READINGS

FLEXIBLE SONIC PROBE

SITE @ 3T1696EA PROBE @ A1011RP READOUT SERIAL @ 000

DEPTH OF COLLAR ANCHOR = 0.200 M READOUT IN inches

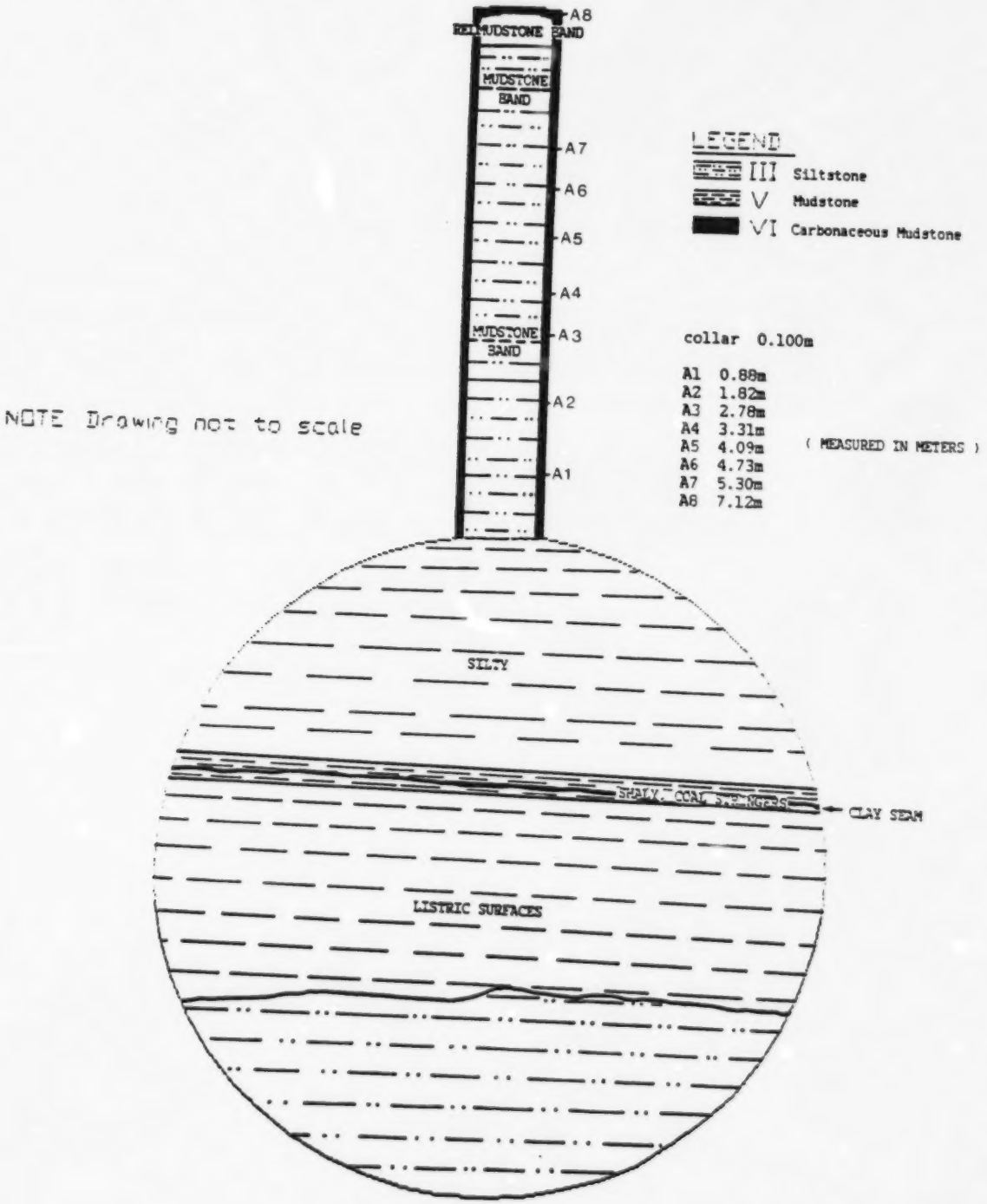
DATE	13-Aug-86	20-Aug-86	26-Aug-86	02-Sep-86
TIME	10:15	10:20	10:05	09:45
CHAINAGE	1854.390	1854.390	1854.390	1855.890
A1=0.52M	12.750	12.760	12.757	12.763
A2=0.80M	24.630	24.640	24.641	24.654
A3=1.05M	34.909	34.930	34.928	34.952
A4=1.38M	47.784	47.800	47.800	47.823
A5=1.97M	71.115	71.130	71.136	71.163
A6=2.53M	93.536	93.560	93.564	93.593
A7=3.05M	114.114	114.133	114.146	114.173
A8=3.66M	138.239	138.260	138.275	138.299

EXTENSION mm

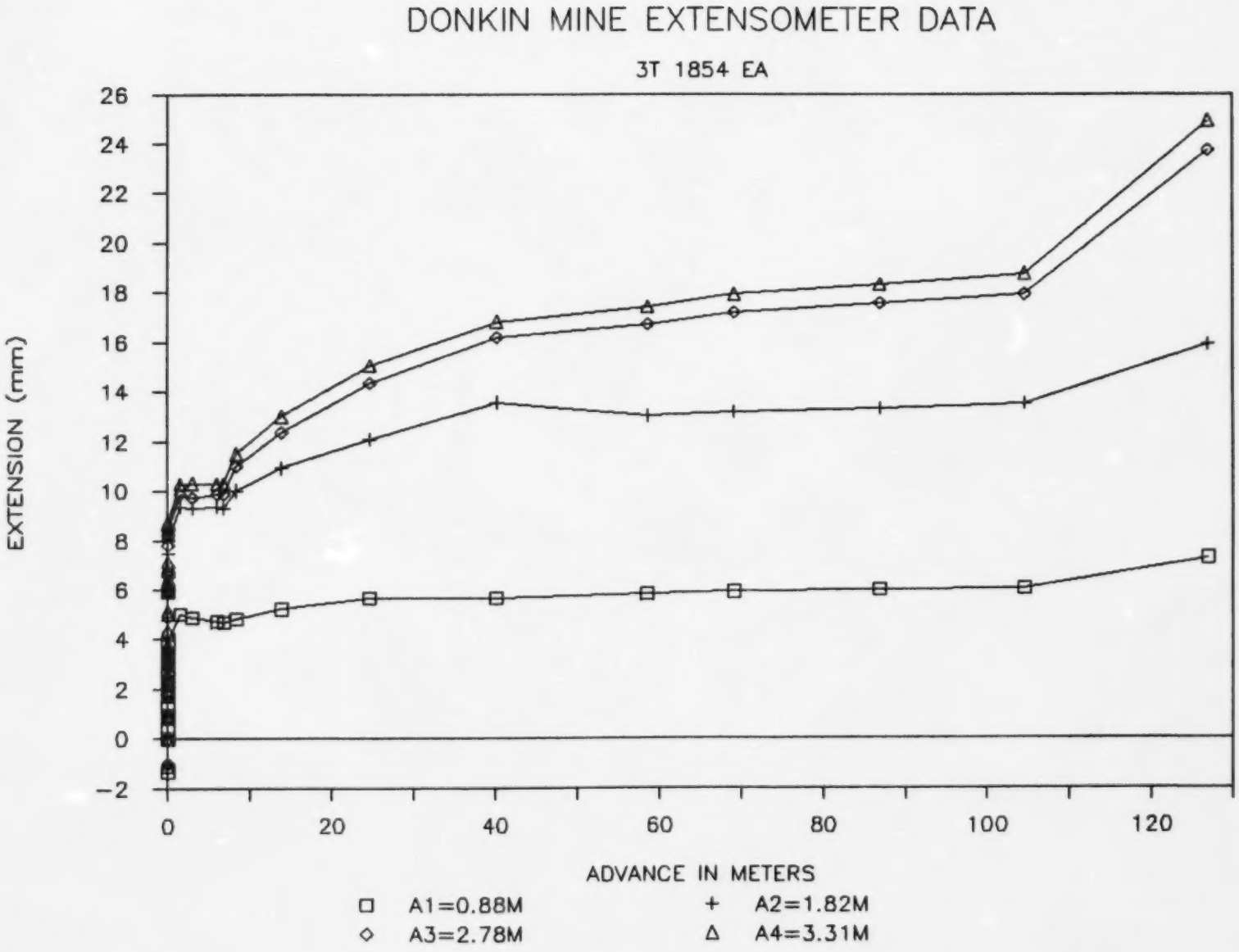
DATE	13-Aug-86	20-Aug-86	26-Aug-86	02-Sep-86
TIME	10:15	10:20	10:05	09:45
CHAINAGE	1854.390	1854.390	1854.390	1855.890
ADVANCE M	158.45	158.45	158.45	159.95
A1=0.52M	7.24	7.70	7.42	7.57
A2=0.80M	23.14	23.60	23.42	23.75
A3=1.05M	31.19	31.72	31.67	32.28
A4=1.38M	34.42	34.82	34.82	35.41
A5=1.97M	38.25	38.84	38.79	39.47
A6=2.53M	45.59	46.20	46.38	47.04
A7=3.05M	46.33	46.81	47.14	47.83
A8=3.66M	46.74	47.27	47.65	48.26

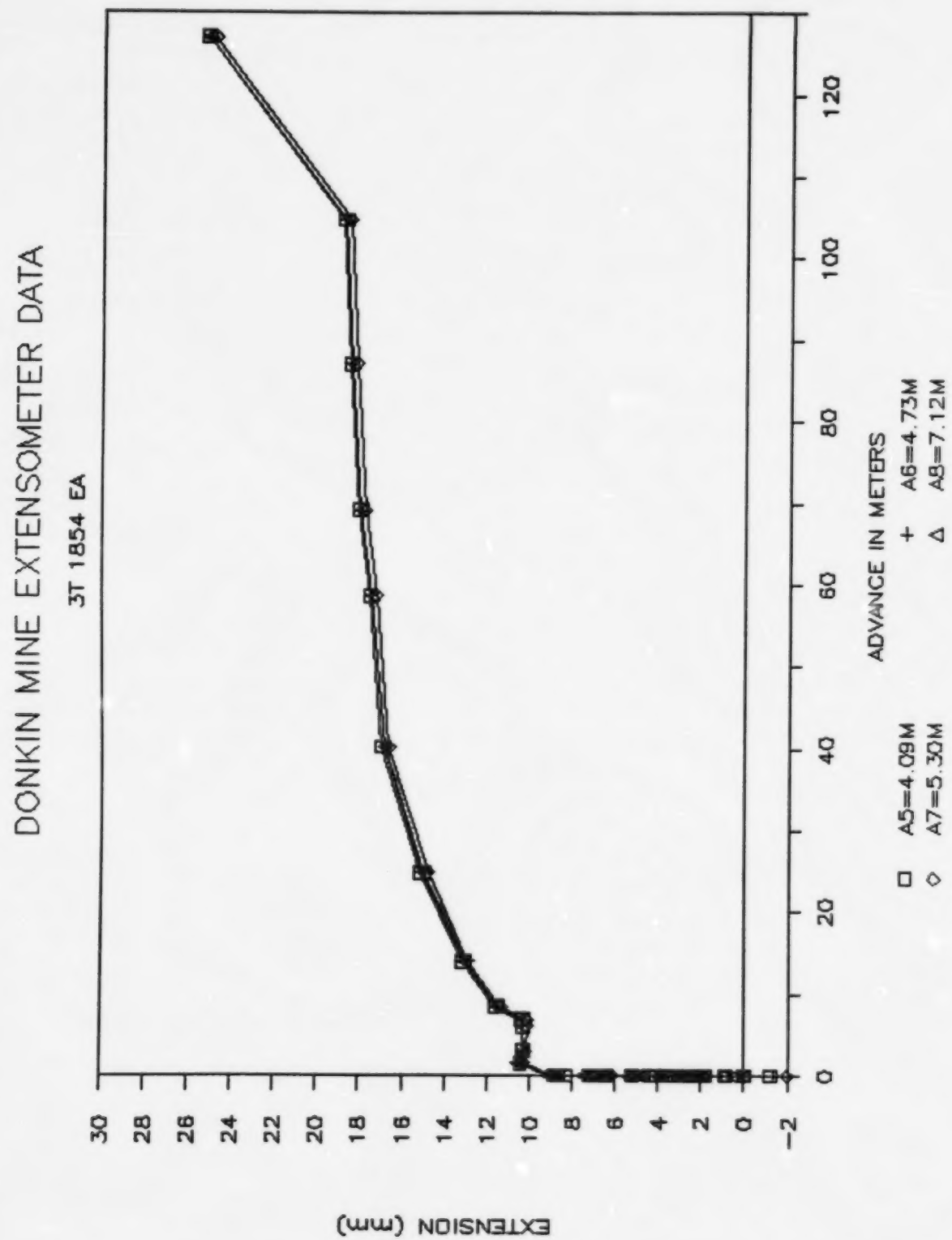
APPENDIX C

1854EA



TUNNEL No. 3


DONKIN MINE EXTENSOMETER DATA
3T 1854 EA
EXTENSION (mm)
26
24
22
20
18
16
14
12
10
8
6
4
2
0
−2
0
20
40
60
80
100
120
ADVANCE IN METERS
A1=0.88M
A2=1.82M
A3=2.78M
A4=3.31M


DONKIN MINE EXTENSOMETER DATA
3T 1854 EA
EXTENSION (mm)
30
28
26
24
22
20
18
16
14
12
10
8
6
4
2
0
-2
0
20
40
60
80
100
120
ADVANCE IN METERS
□ A5=4.09M
+ A6=4.73M
◇ A7=5.30M
Δ A8=7.12M

DONKIN MINE @ 3 TUNNEL

EXTENSOMETER READINGS

FLEXIBLE SONIC PROBE

SITE @ 3T1854EA PROBE @ A1011RP READOUT SERIAL @ 000

DEPTH OF COLLAR ANCHOR = 0.100 M READOUT IN inches

DATE	02-Jun-86	04-Jun-86	06-Jun-86	10-Jun-86	13-Jun-86	17-Jun-86	24-Jun-86	03-Jul-86
TIME	14:30	10:00	10:00	10:00	10:05	10:05	10:15	10:00
CHAINAGE	1854.390	1854.390	1854.390	1854.390	1854.390	1854.390	1854.390	1854.390
A1=0.88M	30.613	30.560	30.631	30.646	30.651	30.648	30.661	30.670
A2=1.82M	67.850	67.797	67.885	67.920	67.938	67.940	67.963	67.980
A3=2.78M	105.426	105.386	105.460	105.496	105.513	105.519	105.542	105.560
A4=3.31M	126.427	126.384	126.465	126.501	126.517	126.529	126.551	126.570
A5=4.09M	156.960	156.920	157.002	157.042	157.059	157.070	157.090	157.112
A6=4.73M	182.527	182.475	182.553	182.596	182.615	182.629	182.647	182.670
A7=5.30M	204.580	204.510	204.623	204.665	204.685	204.701	204.712	204.736
A8=7.12M	276.697		276.720	276.760	276.792	276.805	276.822	276.840

EXTENSION IN mm

DATE	02-Jun-86	04-Jun-86	06-Jun-86	10-Jun-86	13-Jun-86	17-Jun-86	24-Jun-86	03-Jul-86
TIME	14:30	10:00	10:00	10:00	10:05	10:05	10:15	10:00
CHAINAGE	1854.390	1854.390	1854.390	1854.390	1854.390	1854.390	1854.390	1854.390
ADVANCE M	0	0	0	0	0	0	0	0
A1=0.88M	0.00	-1.35	0.46	0.84	0.96	0.89	1.22	1.45
A2=1.82M	0.00	-1.35	0.89	1.78	2.23	2.29	2.87	3.38
A3=2.78M	0.00	-1.02	0.86	1.78	2.21	2.36	2.95	3.40
A4=3.31M	0.00	-1.09	0.96	1.88	2.29	2.59	3.15	3.63
A5=4.09M	0.00	-1.22	0.86	1.88	2.31	2.59	3.10	3.66
A6=4.73M	0.00	-1.32	0.66	1.75	2.23	2.59	3.05	3.63
A7=5.30M	0.00	-1.98	0.89	1.96	2.46	2.87	3.15	3.76
A8=7.12M	0.00		0.58	1.88	2.41	2.74	3.17	3.84

DONKIN MINE @ 3 TUNNEL

EXTENSOMETER READINGS

FLEXIBLE SONIC PROBE

SITE @ 3T1854EA PROBE @ A1811RP READOUT SERIAL @ 888

DEPTH OF COLLAR ANCHOR = 0.100 M READOUT IN inches

DATE	10-Jul-86	14-Jul-86	17-Jul-86	22-Jul-86	24-Jul-86	29-Jul-86	07-Aug-86	13-Aug-86
TIME	09:45	10:20	11:10	11:00	11:45	10:30	10:15	10:00
CHAINAGE	1854.390	1854.390	1854.390	1854.390	1854.390	1854.390	1854.390	1854.390
A1=0.88M	30.665	30.681	30.699	30.723	30.721	30.725	30.732	30.738
A2=1.82M	67.987	68.006	68.039	68.076	68.074	68.080	68.094	68.107
A3=2.78M	105.565	105.593	105.619	105.659	105.661	105.666	105.686	105.691
A4=3.31M	126.575	126.599	126.630	126.674	126.675	126.681	126.697	126.700
A5=4.09M	157.116	157.143	157.172	157.210	157.220	157.224	157.247	157.253
A6=4.73M	182.676	182.703	182.731	182.770	182.781	182.783	182.805	182.811
A7=5.30M	204.746	204.774	204.791	204.830	204.836	204.830	204.862	204.874
A8=7.12M	276.852	276.881	276.910	276.950	276.961	276.955	276.987	276.993

EXTENSION IN mm

DATE	10-Jul-86	14-Jul-86	17-Jul-86	22-Jul-86	24-Jul-86	29-Jul-86	07-Aug-86	13-Aug-86
TIME	09:45	10:20	11:10	11:00	11:45	10:30	10:15	10:00
CHAINAGE	1854.390	1854.390	1854.390	1854.390	1854.390	1854.390	1854.390	1854.390
ADVANCE M	0	0	0	0	0	0	0	0
A1=0.88M	1.32	1.73	2.18	2.79	2.74	2.84	3.02	3.17
A2=1.82M	3.48	3.96	4.80	5.74	5.69	5.84	6.20	6.33
A3=2.78M	3.53	4.24	4.98	5.92	5.97	6.10	6.60	6.73
A4=3.31M	3.76	4.37	5.16	6.27	6.30	6.45	6.86	7.14
A5=4.09M	3.76	4.44	5.18	6.35	6.48	6.58	7.09	7.24
A6=4.73M	3.78	4.47	5.18	6.37	6.45	6.58	7.06	7.21
A7=5.30M	4.01	4.72	5.16	6.15	6.30	6.15	6.96	7.26
A8=7.12M	3.94	4.67	5.41	6.63	6.71	6.55	7.37	7.52

DONKIN MINE @ 3 TUNNEL

EXTENSOMETER READINGS

FLEXIBLE SONIC PROBE

SITE @ 3T1854EA PROBE @ A1011RP READOUT SERIAL @ 000

DEPTH OF COLLAR ANCHOR = 0.100 M READOUT IN inches

DATE	20-Aug-86	26-Aug-86	29-Aug-86	02-Sep-86	02-Sep-86	02-Sep-86	02-Sep-86	03-Sep-86
TIME	10:05	10:20	11:30	10:00	11:00	16:45	19:00	10:20
CHAINAGE	1854.390	1854.390	1854.390	1855.890	1857.390	1860.410	1861.210	1862.790
A1=0.00M	30.759	30.767	30.767	30.810	30.805	30.800	30.797	30.803
A2=1.02M	60.144	60.165	60.164	60.210	60.217	60.210	60.216	60.245
A3=2.70M	105.733	105.750	105.757	105.815	105.809	105.815	105.815	105.859
A4=3.31M	126.751	126.771	126.770	126.832	126.833	126.832	126.832	126.880
A5=4.09M	157.295	157.310	157.310	157.379	157.374	157.376	157.379	157.425
A6=4.73M	102.856	102.870	102.870	102.936	102.931	102.933	102.936	102.902
A7=5.30M	204.920	204.939	204.930	204.994	204.909	204.906	204.906	205.035
A8=7.12M	277.030	277.050	277.050	277.113	277.105	277.103	277.103	277.150

EXTENSION IN mm

DATE	20-Aug-86	26-Aug-86	29-Aug-86	02-Sep-86	02-Sep-86	02-Sep-86	02-Sep-86	03-Sep-86
TIME	10:05	10:20	11:30	10:00	11:00	16:45	19:00	10:20
CHAINAGE	1854.390	1854.390	1854.390	1855.890	1857.390	1860.410	1861.210	1862.790
ADVANCE M	0	0	0	1.5	3	6.02	6.82	8.4
A1=0.00M	3.71	3.91	3.91	5.00	4.00	4.75	4.67	4.03
A2=1.02M	7.47	8.00	7.90	9.35	9.32	9.35	9.30	10.03
A3=2.70M	7.00	8.23	8.41	9.00	9.73	9.00	9.00	11.00
A4=3.31M	8.23	8.74	8.71	10.29	10.31	10.29	10.29	11.51
A5=4.09M	8.31	8.09	8.09	10.44	10.31	10.36	10.44	11.61
A6=4.73M	8.36	8.92	8.92	10.39	10.26	10.31	10.39	11.56
A7=5.30M	8.64	8.92	8.09	10.31	10.10	10.11	10.11	11.35
A8=7.12M	8.66	9.17	9.17	10.57	10.36	10.31	10.31	11.51

DONKIN MINE @ 3 TUNNEL

EXTENSOMETER READINGS

FLEXIBLE SONIC PROBE

SITE @ 3T1854EA PROBE @ A1011RP READOUT SERIAL @ 000

DEPTH OF COLLAR ANCHOR = 0.100 M READOUT IN inches

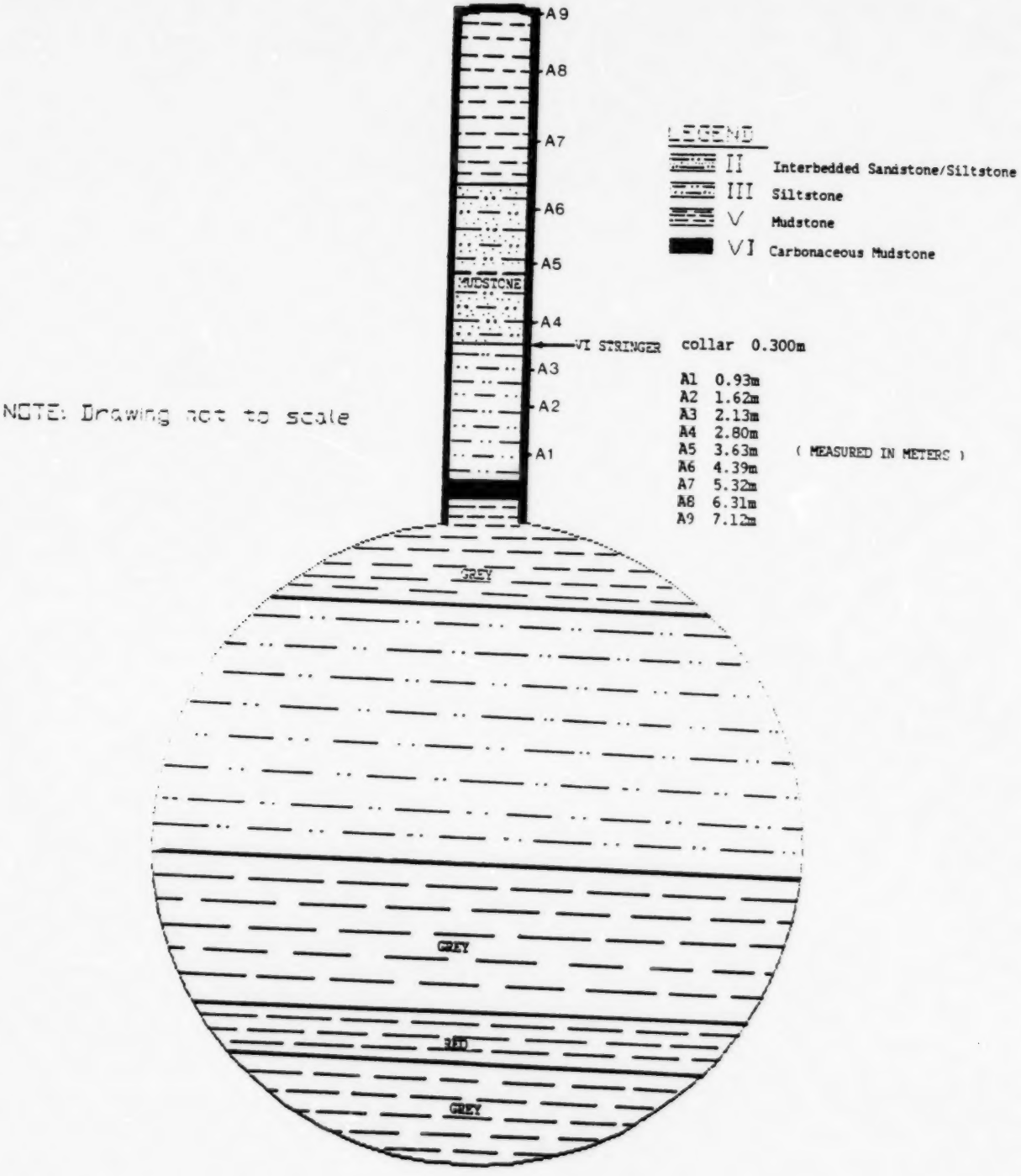
DATE	04-Sep-86	05-Sep-86	08-Sep-86	09-Sep-86	10-Sep-86	11-Sep-86	12-Sep-86	15-Oct-86
TIME	11:10	11:20	11:30	11:00	11:00	12:00	10:00	10:30
CHAINAGE	1868.290	1879.060	1894.510	1912.940	1923.440	1941.340	1958.940	1981.320
A1=0.88M	30.819	30.836	30.836	30.844	30.847	30.849	30.851	30.900
A2=1.82M	68.281	68.326	68.384	68.362	68.368	68.374	68.381	68.476
A3=2.78M	105.913	105.991	106.063	106.084	106.102	106.117	106.131	106.360
A4=3.31M	126.939	127.020	127.089	127.112	127.132	127.148	127.165	127.408
A5=4.09M	157.487	157.566	157.638	157.657	157.678	157.694	157.709	157.959
A6=4.73M	183.039	183.121	183.190	183.214	183.233	183.251	183.267	183.516
A7=5.30M	205.098	205.170	205.243	205.266	205.285	205.302	205.317	205.566
A8=7.12M	277.211	277.287	277.360	277.384	277.403	277.421	277.434	277.688

EXTENSION IN mm

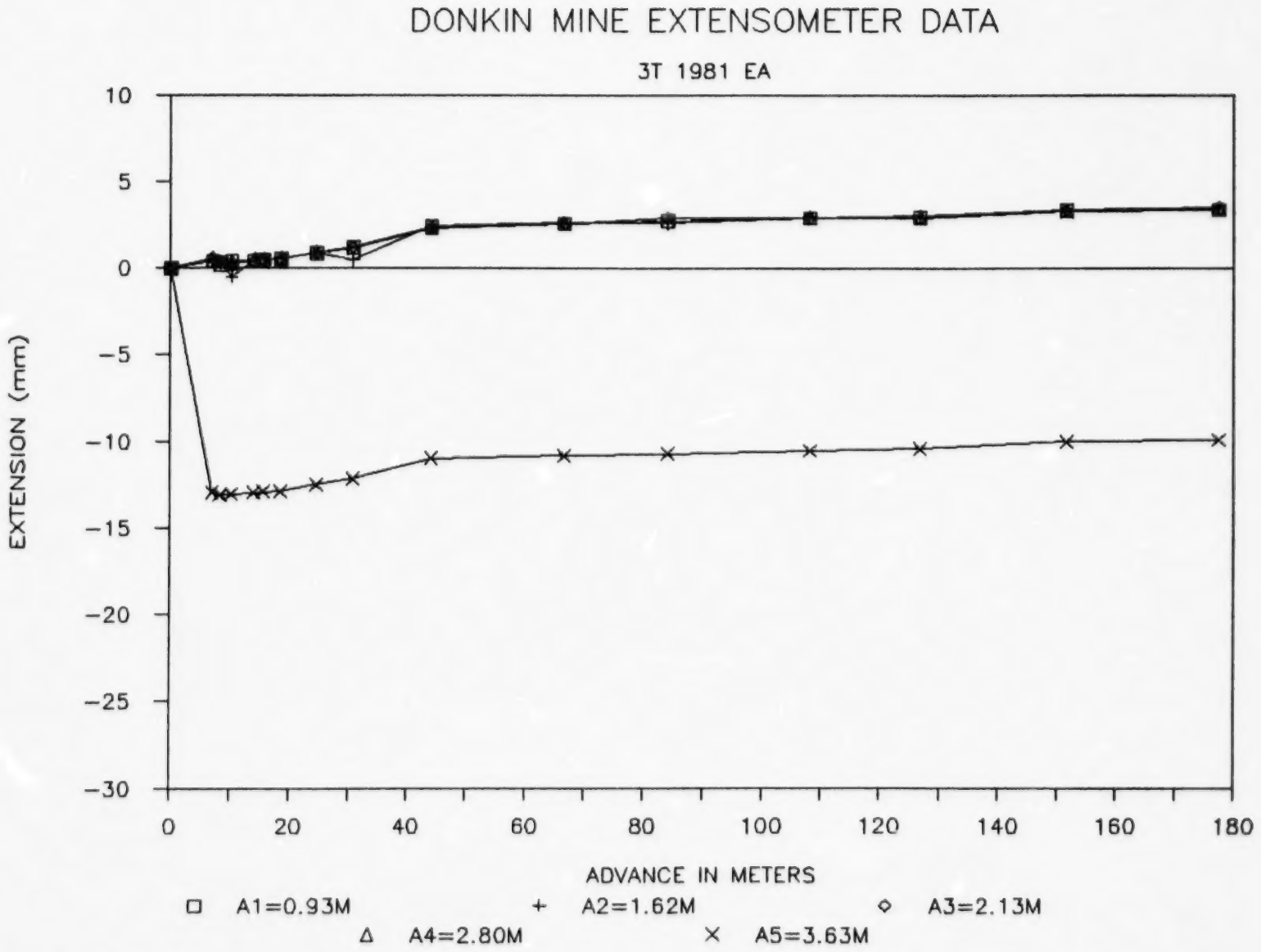
DATE	04-Sep-86	05-Sep-86	08-Sep-86	09-Sep-86	10-Sep-86	11-Sep-86	12-Sep-86	15-Oct-86
TIME	11:10	11:20	11:30	11:00	11:00	12:00	10:00	10:30
CHAINAGE	1868.290	1879.060	1894.510	1912.940	1923.440	1941.340	1958.940	1981.320
ADVANCE M	13.9	24.67	40.12	58.55	69.05	86.95	104.55	126.93
A1=0.88M	5.23	5.66	5.66	5.87	5.94	5.99	6.04	7.29
A2=1.82M	10.95	12.09	13.56	13.00	13.16	13.31	13.49	15.90
A3=2.78M	12.37	14.35	16.18	16.71	17.17	17.55	17.91	23.72
A4=3.31M	13.00	15.06	16.81	17.40	17.91	18.31	18.75	24.92
A5=4.09M	13.18	15.19	17.02	17.58	18.03	18.44	18.82	25.17
A6=4.73M	13.00	15.09	16.84	17.45	17.93	18.39	18.80	25.12
A7=5.30M	12.95	14.78	16.64	17.22	17.70	18.14	18.52	24.84
A8=7.12M	13.06	14.99	16.84	17.45	17.93	18.39	18.72	25.17

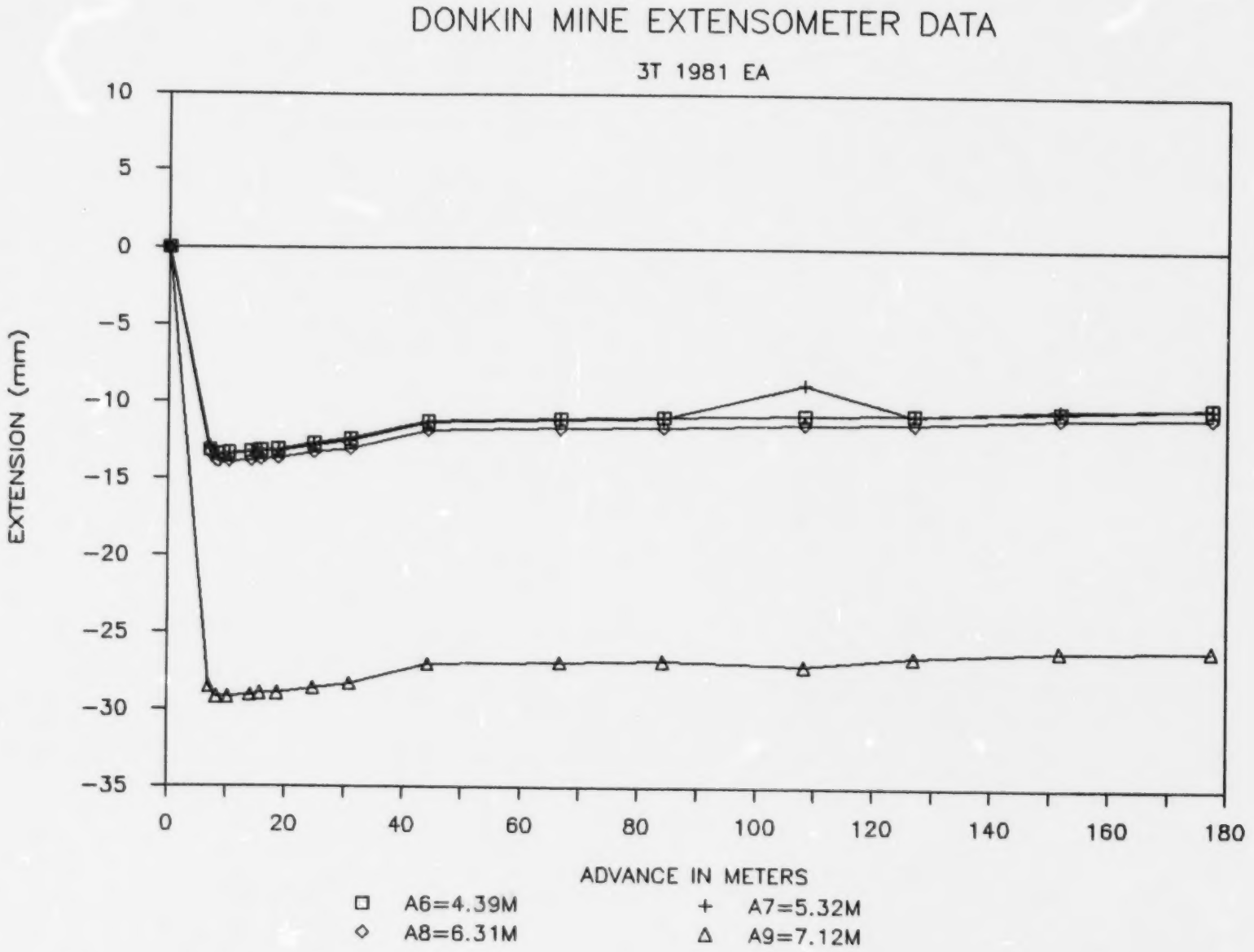
APPENDIX D

1981EA



TUNNEL No. 3


DONKIN MINE EXTENSOMETER DATA
3T 1981 EA
EXTENSION (mm)
10
5
0
−5
−10
−15
−20
−25
−30
0
20
40
60
80
100
120
140
160
180
ADVANCE IN METERS
A1=0.93M
A2=1.62M
A3=2.13M
A4=2.80M
A5=3.63M


DONKIN MINE EXTENSOMETER DATA
3T 1981 EA
EXTENSION (mm)
10
5
0
-5
-10
-15
-20
-25
-30
-35
0
20
40
60
80
100
120
140
160
180
ADVANCE IN METERS
A6=4.39M
A7=5.32M
A8=6.31M
A9=7.12M

DONKIN MINE @ 3 TUNNEL

EXTENSOMETER READINGS

FLEXIBLE SONIC PROBE

SITE @ 3T1981EA PROBE @ A1811RP READOUT SERIAL @ 000

DEPTH OF COLLAR ANCHOR = 0.300 M READOUT IN inches

DATE	15-Oct-86	16-Oct-86	16-Oct-86	16-Oct-86	16-Oct-86	16-Oct-86	16-Oct-86	16-Oct-86
TIME	12:00	03:05	03:30	04:30	06:30	11:00	18:15	22:25
CHAINAGE	1981.320	1988.24	1989.540	1989.650	1991.540	1995.420	1997.020	2000.000
A1=0.93M	18.600	18.617	18.614	18.614	18.616	18.616	18.619	18.622
A2=1.62M	44.947	44.965	44.960	44.960	44.926	44.965	44.967	44.970
A3=2.13M	65.640	65.663	65.654	65.654	65.653	65.657	65.660	65.662
A4=2.80M	91.775	91.792	91.783	91.783	91.784	91.796	91.794	91.796
A5=3.63M	125.586	124.996	124.990	124.992	124.993	124.996	124.999	125.000
A6=4.39M	155.221	154.702	154.691	154.692	154.693	154.698	154.700	154.703
A7=5.32M	192.040	191.529	191.509	191.510	191.509	191.514	191.520	191.519
A8=6.31M	231.022	230.495	230.473	230.473	230.473	230.476	230.480	230.483
A9=7.12M	263.711	262.587	262.561	262.562	262.562	262.565	262.570	262.570

EXTENSION IN mm

DATE	15-Oct-86	16-Oct-86	16-Oct-86	16-Oct-86	16-Oct-86	16-Oct-86	16-Oct-86	16-Oct-86
TIME	12:00	03:05	03:30	04:30	06:30	11:00	18:15	22:25
CHAINAGE	1981.320	1988.24	1989.540	1989.650	1991.540	1995.420	1997.020	2000.000
ADVANCE M	0	6.92	8.22	8.33	10.22	14.1	15.7	18.68
A1=0.93M	0.00	0.43	0.36	0.36	0.41	0.41	0.48	0.56
A2=1.62M	0.00	0.46	0.33	0.33	-0.53	0.46	0.51	0.58
A3=2.13M	0.00	0.58	0.36	0.36	0.33	0.43	0.51	0.56
A4=2.80M	0.00	0.43	0.20	0.20	0.23	0.53	0.48	0.53
A5=3.63M	0.00	-12.95	-13.11	-13.06	-13.03	-12.95	-12.88	-12.85
A6=4.39M	0.00	-13.18	-13.46	-13.44	-13.41	-13.28	-13.23	-13.16
A7=5.32M	0.00	-12.98	-13.49	-13.46	-13.49	-13.36	-13.21	-13.23
A8=6.31M	0.00	-13.39	-13.94	-13.94	-13.94	-13.87	-13.77	-13.69
A9=7.12M	0.00	-28.55	-29.21	-29.18	-29.18	-29.11	-28.98	-28.98

DONKIN MINE @ 3 TUNNEL

EXTENSOMETER READINGS

FLEXIBLE SONIC PROBE

SITE @ 3T1981EA PROBE @ A1011RP READOUT SERIAL @ 000

DEPTH OF COLLAR ANCHOR = 0.300 M READOUT IN inches

DATE	16-Oct-86	17-Oct-86	20-Oct-86	21-Oct-86	22-Oct-86	23-Oct-86	24-Oct-86	27-Oct-86
TIME	05:15	11:15	09:30	10:30	09:30	11:30	11:00	10:15
CHAINAGE	2006.000	2012.100	2025.540	2040.140	2065.540	2089.540	2100.240	2132.940
A1=0.93M	18.634	18.647	18.695	18.702	18.700	18.715	18.716	18.732
A2=1.62M	44.903	44.906	45.043	45.051	45.050	45.063	45.066	45.081
A3=2.13M	65.675	65.688	65.735	65.741	65.754	65.755	65.756	65.774
A4=2.80M	91.809	91.822	91.867	91.876	91.882	91.889	91.892	91.909
A5=3.63M	125.015	125.028	125.076	125.082	125.086	125.094	125.097	125.113
A6=4.39M	154.718	154.730	154.775	154.786	154.791	154.797	154.800	154.800
A7=5.32M	191.533	191.546	191.593	191.602	191.606	191.694	191.616	191.633
A8=6.31M	230.496	230.507	230.554	230.561	230.567	230.575	230.576	230.593
A9=7.12M	262.583	262.595	262.645	262.652	262.657	262.644	262.669	262.685

EXTENSION IN mm

DATE	16-Oct-86	17-Oct-86	20-Oct-86	21-Oct-86	22-Oct-86	23-Oct-86	24-Oct-86	27-Oct-86
TIME	05:15	11:15	09:30	10:30	09:30	11:30	11:00	10:15
CHAINAGE	2006.000	2012.100	2025.540	2040.140	2065.540	2089.540	2100.240	2132.940
ADVANCE M	24.68	30.86	44.22	66.82	84.22	108.22	126.92	151.62
A1=0.93M	0.86	1.19	2.41	2.59	2.74	2.92	2.95	3.35
A2=1.62M	0.91	0.48	2.44	2.64	2.62	2.95	3.02	3.40
A3=2.13M	0.89	1.22	2.41	2.57	2.90	2.92	2.95	3.40
A4=2.80M	0.86	1.19	2.34	2.57	2.72	2.90	2.97	3.40
A5=3.63M	-12.47	-12.14	-10.92	-10.77	-10.67	-10.46	-10.39	-9.98
A6=4.39M	-12.78	-12.47	-11.33	-11.05	-10.92	-10.77	-10.69	-10.49
A7=5.32M	-12.88	-12.55	-11.35	-11.12	-11.02	-8.79	-10.77	-10.34
A8=6.31M	-13.36	-13.08	-11.89	-11.71	-11.56	-11.35	-11.33	-10.90
A9=7.12M	-28.65	-28.35	-27.08	-26.90	-26.77	-27.10	-26.47	-26.06

DONKIN MINE @ 3 TUNNEL

EXTENSOMETER READINGS

FLEXIBLE SONIC PROBE

SITE @ 3T19B1EA PROBE @ A1011RP READOUT SERIAL @ 000

DEPTH OF COLLAR ANCHOR = 0.300 M READOUT IN inches

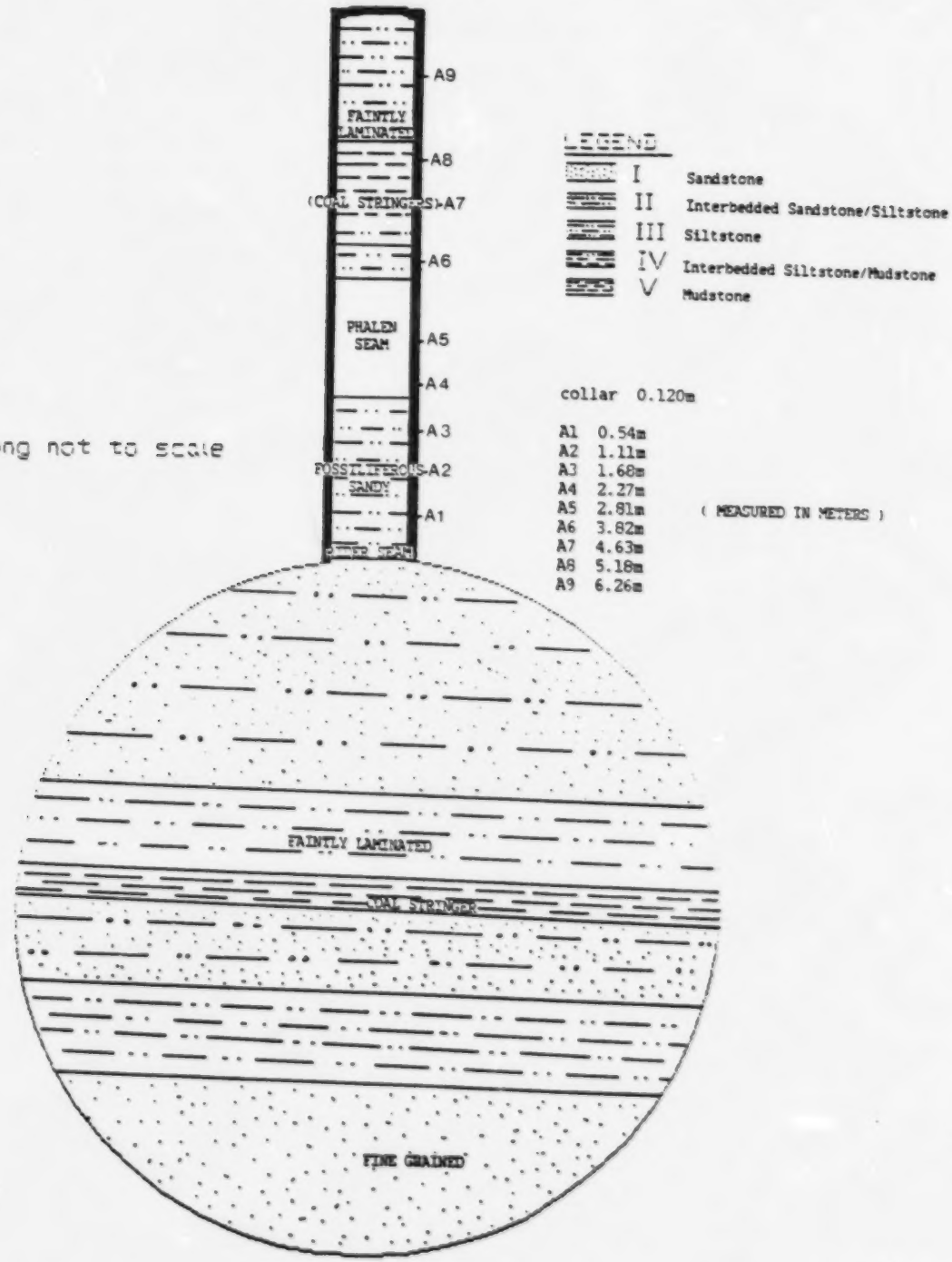
DATE	28-Oct-86
TIME	10:40
CHAINAGE	2158.000
A1=0.93M	18.734
A2=1.62M	45.085
A3=2.13M	65.777
A4=2.80M	91.912
A5=3.63M	125.117
A6=4.39M	154.820
A7=5.32M	191.636
A8=6.31M	230.596
A9=7.12M	262.688

EXTENSION IN mm

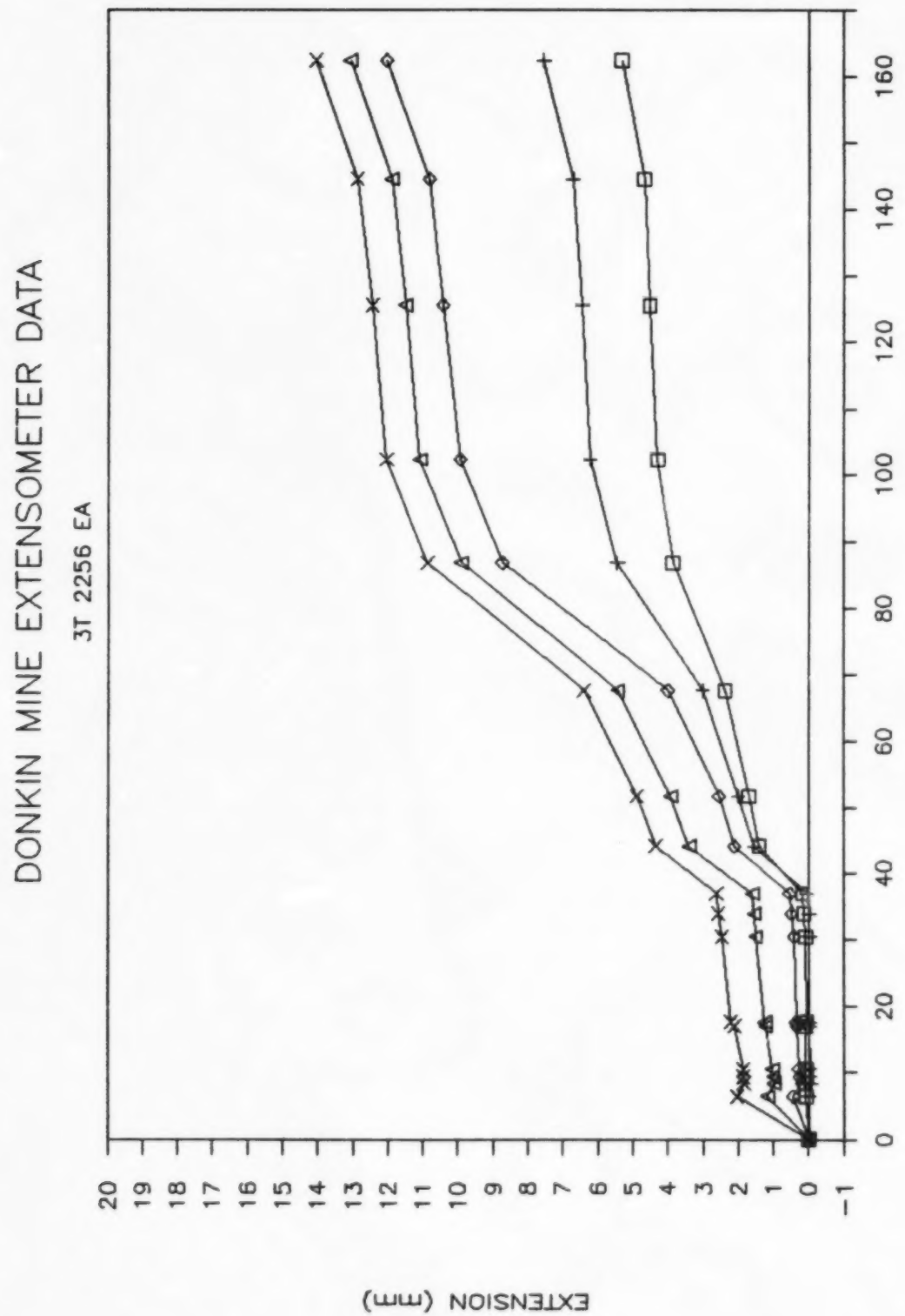
DATE	28-Oct-86
TIME	10:40
CHAINAGE	2158.000
ADVANCE M	177.48
A1=0.93M	3.40
A2=1.62M	3.51
A3=2.13M	3.48
A4=2.80M	3.48
A5=3.63M	-9.00
A6=4.39M	-10.18
A7=5.32M	-10.26
A8=6.31M	-10.82
A9=7.12M	-25.98

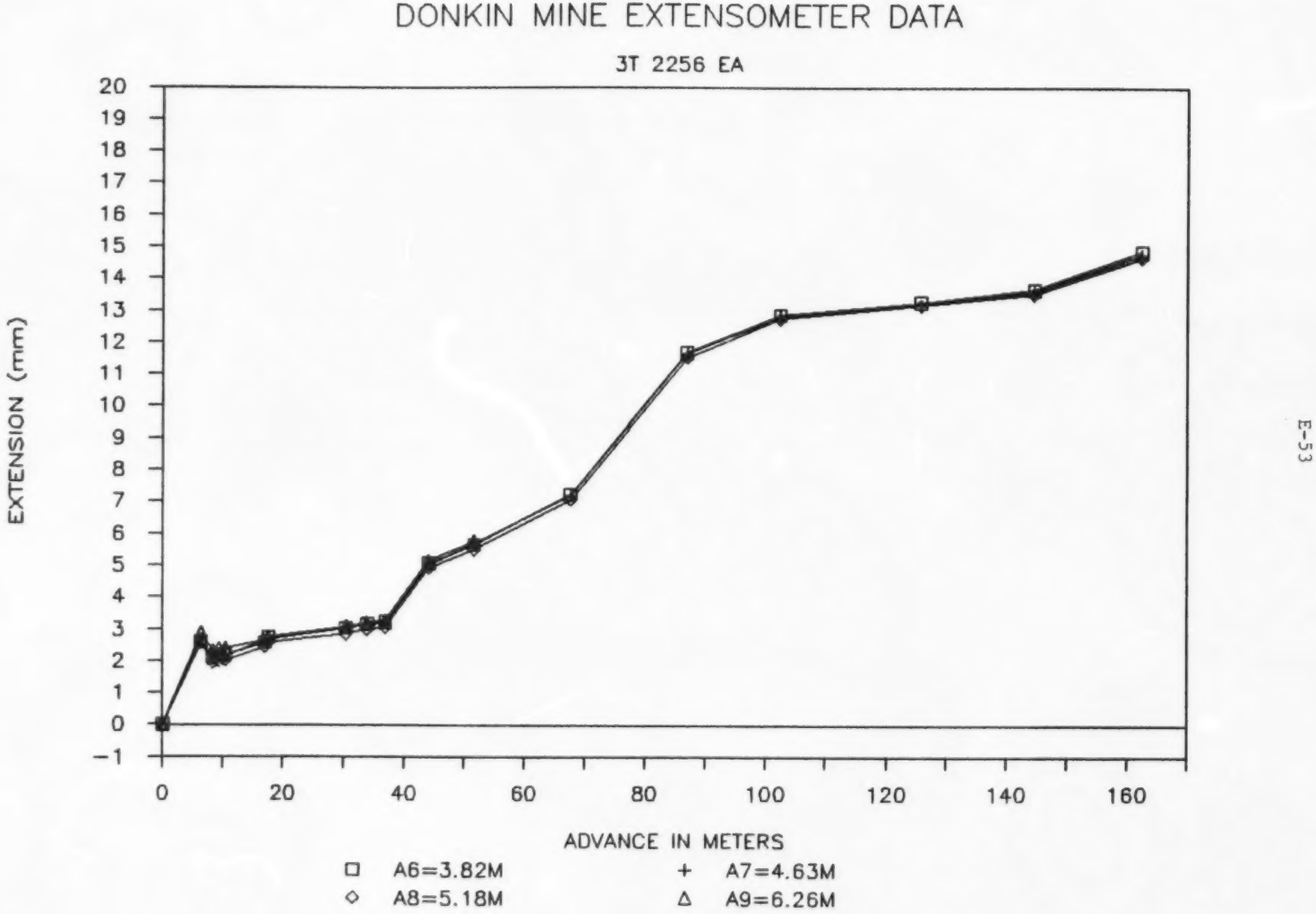
APPENDIX E

2257EA



TUNNEL No. 3


DONKIN MINE EXTENSOMETER DATA
3T 2256 EA
EXTENSION (mm)
20
19
18
17
16
15
14
13
12
11
10
9
8
7
6
5
4
3
2
1
0
-1
0
20
40
60
80
100
120
140
160
ADVANCE IN METERS
□ A1=0.54M
+ A2=1.11M
◇ A3=1.68M
△ A4=2.67M
× A5=2.81M


DONKIN MINE EXTENSOMETER DATA
3T 2256 EA
EXTENSION (mm)
20
19
18
17
16
15
14
13
12
11
10
9
8
7
6
5
4
3
2
1
0
−1
0
20
40
60
80
100
120
140
160
ADVANCE IN METERS
A6=3.82M
A7=4.63M
A8=5.18M
A9=6.26M

DONKIN MINE @ 3 TUNNEL

EXTENSOMETER READINGS

FLEXIBLE SONIC PROBE

SITE @ 3T2256EA PROBE @ A1011RP READOUT SERIAL @ 000

DEPTH OF COLLAR ANCHOR = 0.12M READOUT IN inches

DATE	04-Nov-86	04-Nov-86	05-Nov-86	05-Nov-86	05-Nov-86	05-Nov-86	05-Nov-86	05-Nov-86
TIME	11:00	23:30	00:20	01:00	01:45	07:30	09:00	16:35
CHAINAGE	2256.400	2262.78	2264.74	2265.74	2266.74	2273.32	2274.01	2286.86
A1=0.54M	16.319	16.322	16.323	16.322	16.322	16.323	16.321	16.322
A2=1.11M	38.803	38.803	38.800	38.801	38.801	38.802	38.802	38.802
A3=1.68M	61.115	61.132	61.123	61.125	61.126	61.128	61.129	61.131
A4=2.27M	84.551	84.597	84.590	84.591	84.592	84.599	84.600	84.610
A5=2.81M	106.043	106.123	106.115	106.116	106.116	106.126	106.130	106.140
A6=3.82M	145.369	145.471	145.453	145.454	145.455	145.470	145.477	145.488
A7=4.63M	177.582	177.686	177.664	177.665	177.666	177.686	177.687	177.701
A8=5.18M	211.180	211.281	211.256	211.257	211.259	211.275	211.281	211.292
A9=6.26M	241.819	241.932	241.910	241.912	241.913	241.923	241.927	241.940

EXTENSION IN mm

DATE	04-Nov-86	04-Nov-86	05-Nov-86	05-Nov-86	05-Nov-86	05-Nov-86	05-Nov-86	05-Nov-86
TIME	11:00	23:30	00:20	01:00	01:45	07:30	09:00	16:35
CHAINAGE	2256.400	2262.78	2264.74	2265.74	2266.74	2273.32	2274.01	2286.86
ADVANCE M	0	6.38	8.34	9.34	10.34	16.92	17.61	30.46
A1=0.54M	0.00	0.00	0.10	0.00	0.00	0.10	0.05	0.00
A2=1.11M	0.00	0.00	-0.00	-0.05	-0.05	-0.03	-0.03	-0.03
A3=1.68M	0.00	0.43	0.20	0.25	0.26	0.33	0.36	0.41
A4=2.27M	0.00	1.17	0.99	1.02	1.04	1.22	1.24	1.50
A5=2.81M	0.00	2.03	1.83	1.85	1.85	2.11	2.21	2.46
A6=3.82M	0.00	2.59	2.13	2.16	2.18	2.57	2.74	3.02
A7=4.63M	0.00	2.64	2.08	2.11	2.13	2.64	2.67	3.02
A8=5.18M	0.00	2.57	1.93	1.96	2.01	2.41	2.57	2.84
A9=6.26M	0.00	2.87	2.31	2.36	2.39	2.64	2.74	3.07

DONKIN MINE # 3 TUNNEL

EXTENSOMETER READINGS

FLEXIBLE SONIC PROBE

SITE # 3T2256EA PROBE # A1011RP READOUT SERIAL # 000

DEPTH OF COLLAR ANCHOR = 0.120M READOUT IN inches

DATE	05-Nov-86	05-Nov-86	06-Nov-86	06-Nov-86	07-Nov-86	10-Nov-86	12-Nov-86	13-Nov-86
TIME	20:00	22:35	12:30	18:00	10:00	11:35	09:50	10:00
CHAINAGE	2290.36	2293.36	2300.54	2300.00	2324.00	2343.22	2350.72	2381.94
A1=0.54M	16.324	16.325	16.374	16.386	16.413	16.472	16.489	16.498
A2=1.11M	38.802	38.804	38.864	38.882	38.922	39.019	39.049	39.058
A3=1.68M	61.134	61.136	61.198	61.215	61.274	61.460	61.507	61.526
A4=2.27M	84.612	84.614	84.685	84.706	84.766	84.942	84.988	85.005
A5=2.81M	106.144	106.146	106.214	106.236	106.296	106.472	106.518	106.534
A6=3.82M	145.493	145.496	145.568	145.591	145.654	145.829	145.875	145.891
A7=4.63M	177.705	177.707	177.779	177.805	177.866	178.040	178.086	178.100
A8=5.18M	211.297	211.300	211.373	211.396	211.458	211.634	211.681	211.698
A9=6.26M	241.945	241.948	242.022	242.046				

EXTENSION IN mm

DATE	05-Nov-86	05-Nov-86	06-Nov-86	06-Nov-86	07-Nov-86	10-Nov-86	12-Nov-86	13-Nov-86
TIME	20:00	22:35	12:30	18:00	10:00	11:35	09:50	10:00
CHAINAGE	2290.36	2293.36	2300.54	2300.00	2324.00	2343.22	2350.72	2381.94
ADVANCE M	33.96	36.96	44.14	51.6	67.6	86.82	102.32	125.54
A1=0.54M	0.13	0.15	1.48	1.70	2.39	3.09	4.32	4.55
A2=1.11M	-0.03	0.03	1.55	2.01	3.02	5.49	6.25	6.48
A3=1.68M	0.48	0.53	2.11	2.54	4.04	8.76	9.96	10.44
A4=2.27M	1.55	1.60	3.48	3.94	5.46	9.93	11.10	11.53
A5=2.81M	2.57	2.62	4.34	4.98	6.43	10.90	12.06	12.47
A6=3.82M	3.15	3.23	5.05	5.64	7.24	11.68	12.85	13.26
A7=4.63M	3.12	3.17	5.00	5.66	7.21	11.63	12.80	13.16
A8=5.18M	2.97	3.05	4.90	5.49	7.06	11.53	12.73	13.16
A9=6.26M	3.20	3.20	5.16	5.77				

DONKIN MINE # 3 TUNNEL

EXTENSOMETER READINGS

FLEXIBLE SONIC PROBE

SITE # 3T2256EA PROBE # A1011RP READOUT SERIAL # 000

DEPTH OF COLLAR ANCHOR = 0.120M READOUT IN inches

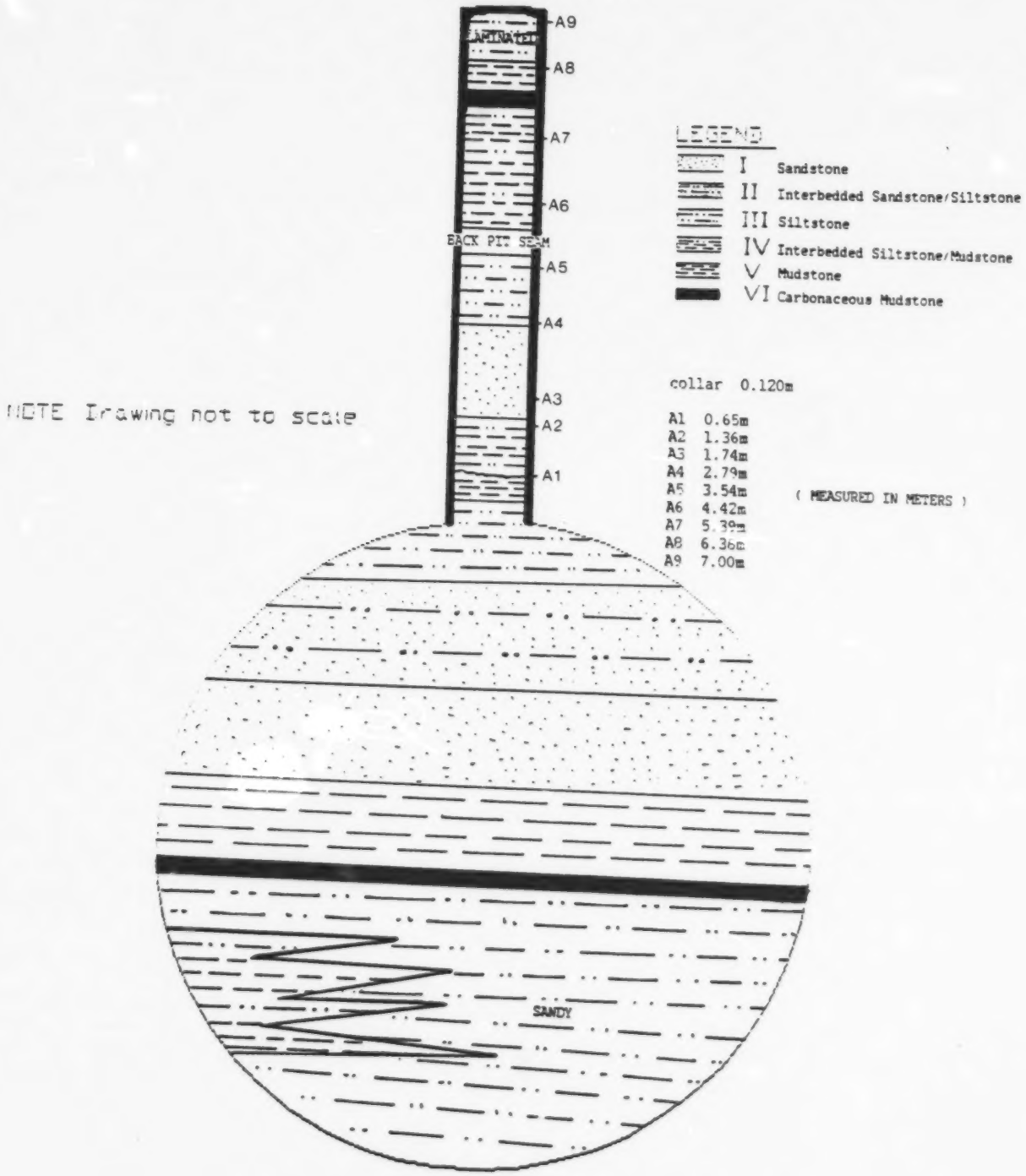
DATE	14-Nov-86	17-Nov-86
TIME	09:50	10:30
CHAINAGE	2400.00	2418.70
A1=0.54M	16.504	16.529
A2=1.11M	39.069	39.101
A3=1.68M	61.542	61.589
A4=2.27M	85.020	85.066
A5=2.81M	106.550	106.596
A6=3.82M	145.907	145.954
A7=4.63M	178.117	178.163
A8=5.18M	211.712	211.757
A9=6.26M		

EXTENSION IN mm

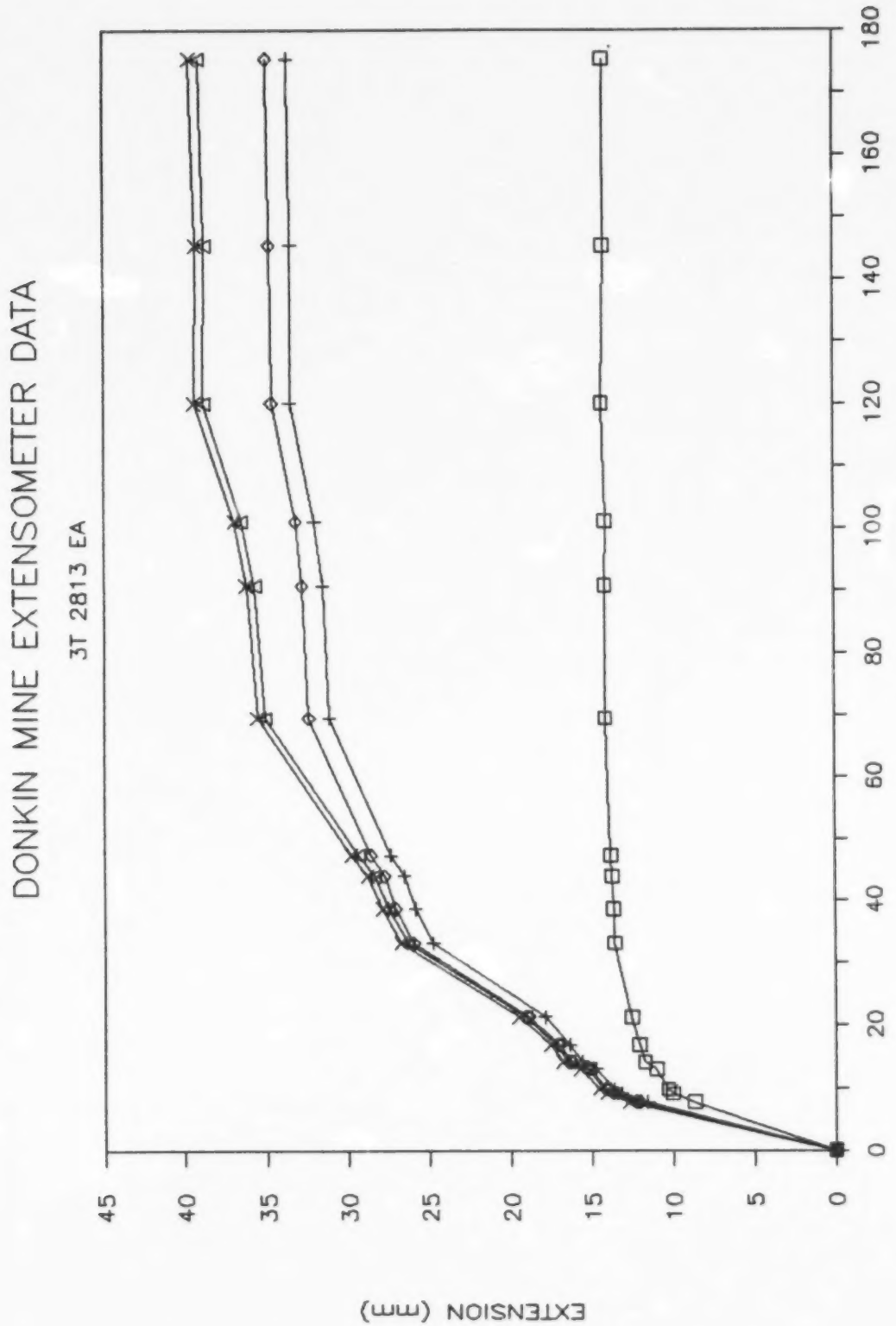
DATE	14-Nov-86	17-Nov-86
TIME	09:50	10:30
CHAINAGE	2400.00	2418.70
ADVANCE M	144.40	162.3
A1=0.54M	4.70	5.33
A2=1.11M	6.76	7.57
A3=1.68M	10.85	12.04
A4=2.27M	11.91	13.00
A5=2.81M	12.00	14.05
A6=3.82M	13.67	14.86
A7=4.63M	13.59	14.76
A8=5.18M	13.51	14.66
A9=6.26M		

APPENDIX F

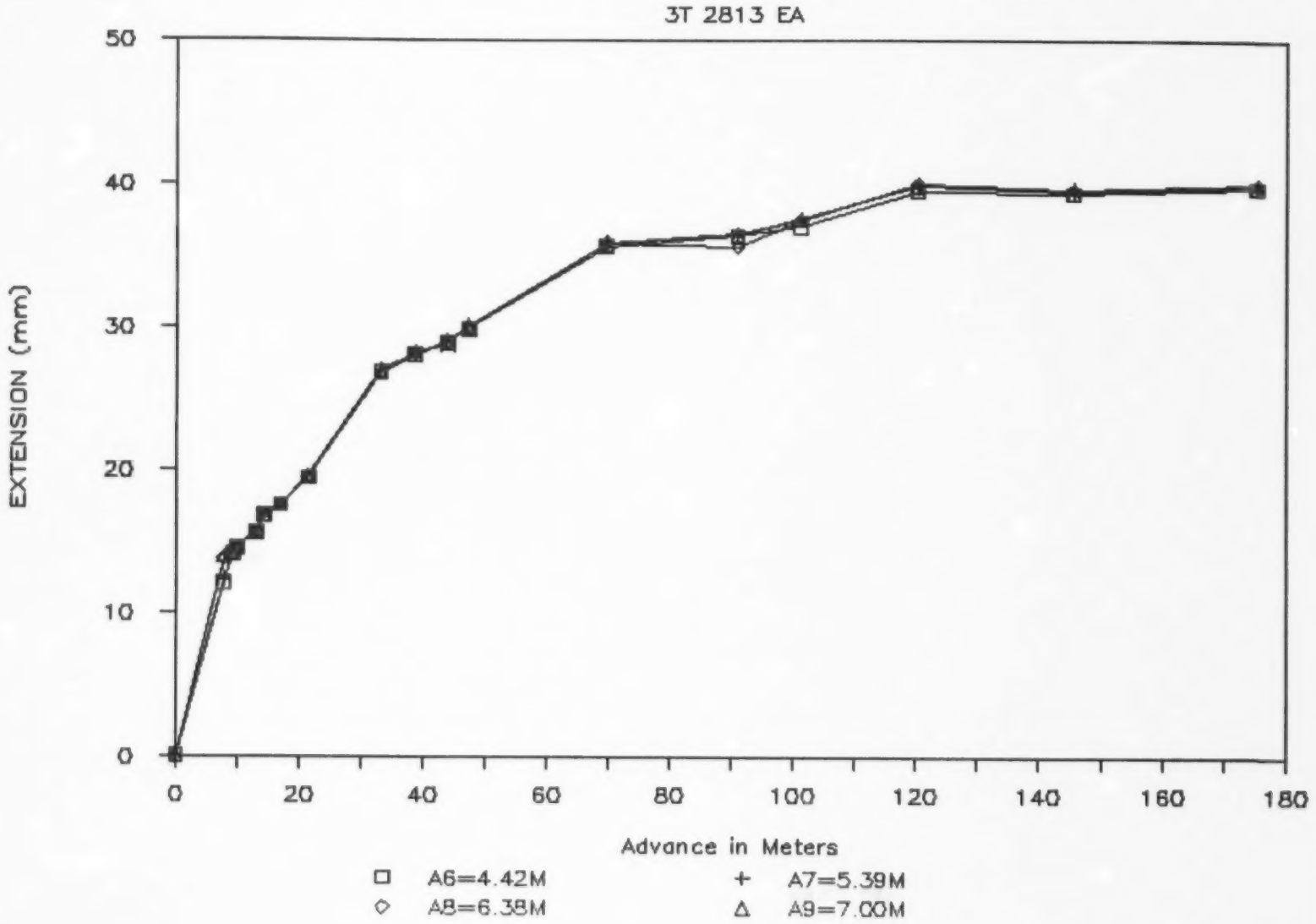
2812.87EA



TUNNEL No. 3


DONKIN MINE EXTENSOMETER DATA
3T 2813 EA
EXTENSION (mm)
0
5
10
15
20
25
30
35
40
45
0
20
40
60
80
100
120
140
160
180
Advance in Meters
□ A1=0.65M
+ A2=1.36M
◇ A3=1.74M
△ A4=2.79M
× A5=3.54M

DONKIN MINE EXTENSOMETER DATA



DONKIN MINE # 3 TUNNEL

EXTENSOMETER READINGS

FLEXIBLE SONIC PROBE

SITE # 3T2813EA PROBE # A1011RP READOUT SERIAL # 000

DEPTH OF COLLAR ANCHOR = 0.120M READOUT IN inches

DATE	15-Dec-86	16-Dec-86	16-Dec-86	16-Dec-86	16-Dec-86	06-Dec-86	16-Dec-86	17-Dec-86
TIME	14:00	11:00	12:30	13:20	15:30	17:00	20:00	01:00
CHAINAGE	2812.870	2820.52	2821.97	2822.57	2825.77	2826.97	2829.67	2834.17
A1=0.65M	20.398	20.748	20.792	20.804	20.832	20.859	20.873	20.892
A2=1.36M	48.516	48.971	49.034	49.052	49.096	49.130	49.161	49.219
A3=1.74M	63.711	64.185	64.250	64.265	64.309	64.350	64.379	64.455
A4=2.79M	104.999	105.489	105.543	105.560	105.602	105.646	105.675	105.750
A5=3.54M	134.520	135.019	135.074	135.092	135.139	135.181	135.210	135.287
A6=4.42M	169.289	169.764	169.843	169.860	169.905	169.951	169.978	170.053
A7=5.39M	207.303	207.787	207.858	207.876	207.919	207.966	207.993	208.074
A8=6.38M	246.250	246.790	246.806	246.823	246.866	246.914	246.940	247.015
A9=7.00M	270.709	271.255	271.263	271.281	271.322	271.367	271.399	271.475

EXTENSION IN mm

DATE	15-Dec-86	16-Dec-86	16-Dec-86	16-Dec-86	16-Dec-86	06-Dec-86	16-Dec-86	17-Dec-86
TIME	14:00	11:00	12:30	13:20	15:30	17:00	20:00	01:00
CHAINAGE	2812.870	2820.52	2821.97	2822.57	2825.77	2826.97	2829.67	2834.17
ADVANCE M	0	7.65	9.1	9.7	12.9	14.1	16.8	21.3
A1=0.65M	0.00	0.69	10.81	10.31	11.87	11.71	12.06	12.55
A2=1.36M	0.00	11.56	13.16	13.61	14.73	15.60	16.38	17.86
A3=1.74M	0.00	12.04	13.69	14.07	15.19	16.23	16.97	18.90
A4=2.79M	0.00	12.45	13.82	14.25	15.32	16.43	17.17	19.08
A5=3.54M	0.00	12.67	14.07	14.53	15.72	16.79	17.53	19.48
A6=4.42M	0.00	12.06	14.07	14.50	15.65	16.81	17.50	19.41
A7=5.39M	0.00	12.29	14.10	14.55	15.65	16.84	17.53	19.58
A8=6.38M	0.00	13.72	14.12	14.55	15.65	16.87	17.53	19.43
A9=7.00M	0.00	13.87	14.07	14.53	15.57	16.71	17.53	19.46

DONKIN MINE @ 3 TUNNEL

EXTENSOMETER READINGS

FLEXIBLE SONIC PROBE

SITE @ 3T2813EA PROBE @ A1011RP READOUT SERIAL @ 000

DEPTH OF COLLAR ANCHOR = 0.120M READOUT IN inches

DATE	17-Dec-86	17-Dec-86	18-Dec-86	18-Dec-86	04-Jan-00	23-Dec-86	24-Dec-86	29-Dec-86
TIME	18:50	23:50	04:50	11:00	10:50	10:50	10:00	11:00
CHAINAGE	2845.97	2851.47	2856.67	2860.07	2882.36	2903.62	2913.91	2932.86
A1=0.65M	20.934	20.936	20.939	20.942	20.956	20.955	20.954	20.961
A2=1.36M	49.490	49.532	49.559	49.592	49.742	49.756	49.776	49.835
A3=1.74M	64.732	64.775	64.803	64.835	64.986	65.002	65.016	65.075
A4=2.79M	106.034	106.082	106.114	106.152	106.300	106.405	106.436	106.527
A5=3.54M	135.572	135.618	135.652	135.691	135.920	135.946	135.975	136.071
A6=4.42M	170.343	170.392	170.425	170.462	170.690	170.710	170.745	170.843
A7=5.39M	208.364	208.409	208.442	208.485	208.712	208.739	208.776	208.878
A8=6.38M	247.303	247.358	247.385	247.429	247.660	247.648	247.722	247.824
A9=7.00M	271.766	271.812	271.845	271.885	272.116	272.142	272.186	272.277

EXTENSION IN mm

DATE	17-Dec-86	17-Dec-86	18-Dec-86	18-Dec-86	22-Dec-86	23-Dec-86	24-Dec-86	29-Dec-86
TIME	18:50	23:50	04:50	11:00	10:50	10:50	10:00	11:00
CHAINAGE	2845.97	2851.47	2856.67	2860.07	2882.36	2903.62	2913.91	2932.86
ADVANCE M	33.1	38.6	43.8	47.2	69.49	90.75	101.04	119.99
A1=0.65M	13.61	13.67	13.74	13.82	14.17	14.15	14.12	14.20
A2=1.36M	24.74	25.81	26.49	27.33	31.14	31.50	32.00	33.50
A3=1.74M	25.93	27.03	27.74	28.55	32.38	32.79	33.15	34.65
A4=2.79M	26.29	27.51	28.32	29.29	35.00	35.71	36.50	38.81
A5=3.54M	26.72	27.89	28.75	29.74	35.56	36.22	36.96	39.39
A6=4.42M	26.77	28.02	28.85	29.79	35.59	36.30	36.98	39.47
A7=5.39M	26.95	28.09	28.93	30.02	35.79	36.47	37.41	40.00
A8=6.38M	26.75	28.14	28.83	29.95	35.01	35.51	37.39	39.98
A9=7.00M	26.85	28.02	28.85	29.87	35.74	36.40	37.52	39.83

DONKIN MINE @ 3 TUNNEL

EXTENSOMETER READINGS

FLEXIBLE SONIC PROBE

SITE @ 3T2B13EA PROBE @ A1011RP READOUT SERIAL @ 000

DEPTH OF COLLAR ANCHOR = 0.12M READOUT IN inches

DATE	30-Dec-86	31-Dec-86
TIME	11:00	11:00
CHAINAGE	2958.16	2988.11
A1=0.65M	20.957	20.957
A2=1.36M	49.833	49.840
A3=1.74M	65.879	65.885
A4=2.79M	106.524	106.538
A5=3.54M	136.867	136.881
A6=4.42M	170.836	170.852
A7=5.39M	208.863	208.875
A8=6.38M	247.809	247.821
A9=7.00M	272.261	272.276

EXTENSION IN mm

DATE	30-Dec-86	31-Dec-86
TIME	11:00	11:00
CHAINAGE	2958.16	2988.11
ADVANCE M	145.29	175.24
A1=0.65M	14.20	14.20
A2=1.36M	33.45	33.63
A3=1.74M	34.75	34.90
A4=2.79M	38.73	39.09
A5=3.54M	39.29	39.65
A6=4.42M	39.29	39.70
A7=5.39M	39.62	39.93
A8=6.38M	39.60	39.90
A9=7.00M	39.42	39.80